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PROCEEDINGS

OF THE

Bristol Naturalists' Society

VOLUME XXXII, 1970–1972

EDITED BY J. W. COWIE

ASSISTED BY A COMMITTEE

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"Rerum cognoscere causas"—Virgil

Authors alone are responsible for the accuracy of their articles

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Proc. Bristol Nat. Soc. 32 pp. 1—314

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1970

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Issued 31st August, 1971

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All matter for inclusion in the next issue of the *Proceedings* should be sent to:—

Dr. J. W. Cowie,
Department of Geology,
University of Bristol,
Queen's Building,
University Walk,
Bristol, bs8

not later than feb. 28.

Other instructions for authors appear on Contents page.

All Books, Pamphlets, Reports of Proceedings sent by way exchange, gift or otherwise, and all correspondence relating there and to purchases of the Society's publications should be addressed to:—

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The City Museum,
Bristol, bs8

Applications for membership of the Society should be addressed to the Hon. Treasurer:—

P. J. M. Nethercott, Esq.,
6 Hazelwood,
Hazelwood Road,
Bristol, bs9 1pu

Enquiries concerning Field Meetings should be made of the Hon. Secretary, Field Committee:—

Dr. A. F. Devonshire,
59 Falcondale Road,
Westbury-on-Trym,
Bristol, bs9 3jp

All other communications should be addressed to the Hon. Secretary:—

Miss A. Heckels, B.Sc.,
5 Princes Building,
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INSTRUCTIONS TO AUTHORS

1. All matter offered for publication in the "PROCEEDINGS" must be sent as directed on p. 2 of cover of current issue.
2. To ensure consideration for inclusion in the next issue, contributions must be received not later than February 28.
3. All copy must be type-written with double spacing and good margins.
4. Copy submitted is not returnable and authors are advised to keep a duplicate.
5. At the discretion of the Hon. Editor, contributors may be required to furnish short abstracts of their communications, for printing as summaries.
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1970

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R. G. SYMES, B.Sc.

Ex-officio the Professors of
Botany, Geology and Zoology at the University of Bristol

REPORT OF COUNCIL, 1970

THE membership now stands at 762 including 71 juniors. There are 16 affiliated societies.

At the Annual General Meeting the Officers and Members of Council were elected with S. M. Taylor as President. The other meetings held were well supported but in November the University was unable to accommodate us due to "work to rule" effects. However the meetings were postponed to a later date and not abandoned. The Annual Dinner was held in the Senior Common Room of the University, our Guest Speaker being K. T. Batty, one of our Vice-Presidents, who showed films on "The Lonely Places—The Electricity Generating Board and Conservation."

The Conservation Committee continues to work diligently and effectively.

During the year the Society has suffered from the deaths of Mrs. G. S. Wakefield, Mr. D. G. Gibb, Mr. W. J. Munden, Mr. I. R. P. Heslop, Mr. F. J. Burnett, Mr. J. V. Pearman and Miss A. M. Sampson.

GWYNNETH STERNE, *Hon. Secretary.*

LIBRARIAN'S REPORT, 1970

EXCHANGE of publications with the Northamptonshire Natural History Society and Field Club has been discontinued.

170 books and periodicals were borrowed by 37 members and of these 82 books were borrowed by five members.

R. BRADSHAW, *Hon. Librarian.*

REPORT OF ENTOMOLOGICAL SECTION, 1970

AT the Annual General Meeting on 6 January the following were elected: President and Secretary, T. B. Silcocks; Assistant Secretary, A. D. R. Brown; Committee: P. F. Bird, J. F. Burton, D. G. Gibb, A. N. Grose, A. Kennard.

During 1970 the following meetings took place:

Mar. 16: Joint with Botanical Section, Plant Galls by Mr. Arnold Darlington.

May 9: and Aug. 8: Saddlewood Roughs and Newark. Leaders, Mr. and Mrs. R. E. Knight.

Sept. 5: Wotton-under-Edge. Leader, Mr. J. Muggleton.

Nov. 17: Annual Exhibition at the City Museum.

T. B. SILCOCKS, *Hon. Secretary.*

ACCOUNTS FOR THE YEAR ENDED 31 DECEMBER 1970

Dr.

1969 £		£ s. d.	£ s. d.
	Members' Subscriptions:		
653	Full Members	803 12 6	
71	Full Members of the same household	76 12 0	
15	Corresponding Members	20 5 0	
21	Associates	9 0 0	
26	Juniors	35 0 0	
28	Affiliated Societies	26 10 0	
814			970 19 6
	Donations		3 0 0
164	*Proceedings:*		
	Grants	35 0 0	
	Offprints	27 16 0	
	Sales	20 10 7	
	Advertisements	12 10 0	
978			95 16 7
	Field Committee: profit		15 14 8
5	Sale of Badges		7 13 6
	1970 Film Show: profit	18 5 9	
	refund of prepayment	18 7 6	
			36 13 3
1	Interest from National Savings Bank		17 0
32	Interest on Bonds and premiums thereon		25 17 10
1,017			
5	Members contributions to the Harry Savory Illustrations Fund		7 10 0
671	Balance from last account		581 16 10
£1,693			£1,745 19 2

Cr.

1969 £		£ s. d.	£ s. d.
189	General Printing and Stationery	218 12 9	
150	Postages and telephone	145 17 1	
	Cheque books	15 0	
12	Clerical assistance	12 0 0	
351			377 4 10
576	*Proceedings* (1969, including offprints)		642 0 0
5	Books	12 16 0	
36	Subscriptions for journals, etc.	37 10 2	
	Rent (of library room)	1 0	
	Fire insurance (library)	4 10 0	
			54 17 2
6	Contributions to Council for Nature, etc.		6 5 0
23	Fares and expenses of general meetings		6 0 0
1	Field Committee: excess expenditure		– – –
	Loss on dinner		14 0
95	Grants to Sections:		
	Botanical	10 0 0	
	Entomological	10 0 0	
	Geological	10 0 0	
	Mammal	15 0 0	
	Ornithological	30 0 0	
	Junior	10 0 0	
1,093			85 0 0
18	1970 Film Show: prepayment		
	Balances to next account:		
58	Cash in bank	63 2 6	
35	Deposit in National Savings Bank	35 14 1	
430	*£200 5½% National Development Bonds	200 0 0	
	£200 7% British Savings Bonds	200 0 0	
59	In hands of Field Committee	75 1 7	
			573 18 2
£1,693			£1,745 19 2

*Including the Harry Savory Illustrations Fund £50 2s. 6d.

NOTE: These accounts do not record balances held by sectional treasurers and the Ornithological Section Special Fund of £82 14s. 9d.

P. J. M. NETHERCOTT, *Hon. Treasurer,*
14 January, 1971

Audited and found correct, **A. E. BILLETT,** *Hon. Auditor,*
18 January, 1971

REPORT OF BOTANICAL SECTION, 1970

AT the Annual General Meeting in the Small Geology Lecture Theatre on 26 January, 1970, the following officers were elected:—President, Dr. D. H. Brown; Secretary and Treasurer, Miss I. F. Gravestock; Committee: Dr. T. E. T. Bond, Mr. C. H. Cummins, Mrs. N. Vaughan Davies, Dr. A. F. Devonshire, Mr. P. J. M. Nethercott, Dr. D. H. Peregrine, Miss A. M. Sampson and Dr. C. E. D. Smith.

The wild plant table at the Museum continued to be much appreciated, and thanks are offered to Mr. N. Thomas and Mr. P. F. Bird of the Museum and to Mr. E. S. Smith and Mr. and Mrs. Cummins, as well as to members who contributed specimens.

The following winter meetings were held during the year:—

Jan. 26: Annual General Meeting and a Further Progress Report on the Somerset Flora by Capt. R. G. B. Roe; also Members' Evening.

Feb. 23: Guernsey and its Plants, by Dr. A. F. Devonshire.

Oct. 26: Members' Evening, with transparencies.

Nov. 23: Conservation in Gloucestershire, by Dr. M. H. Martin.

The following field excursions took place, the year being a particularly successful one both in 'breaking' new ground and in the species recorded. Leaders are shown below:—

Mar. 7: Cheddar Gorge Lichens. Dr. D. H. Brown.

Apr. 22: Penpole Point. Miss I. F. Gravestock. *Arabis scabra* still flourishing in quarry

May 16: Woodchester Park, Breakheart Reserve and Frocester Hill. Mrs. B. Mack.

Abundance of *Convallaria majalis* and *Polygonatum odoratum* in the reserve.

June 2: St. Anne's Board Mills and Bank of the Avon. Dr. D. H. Peregrine.

June 9: Cleeve Wood. Mr. P. J. M. Nethercott. *Ornithogalum pyrenaicum* still abundant.

June 13: Cromhall. Dr. D. H. Peregrine.

July 8: Bristol Forest. Dr. A. F. Devonshire.

July 17: St. George's Wharf. Mr. P. J. M. Nethercott.

Lathyrus nissolia Bupleurum tenuissimum, *Ruppia maritima*, and *Alopecurus bulbosus* still found.

July 25; Hatchet Pond, Beaulieu, Hants. Dr. A. F. Devonshire and members of the Southampton Naturalists' Society. This famous botanical locality yielded abundance of *Ludwigia palustris* (confined in Great Britain to the New Forest) *Galium debile, Cicendia filiformis* and *Hypericum elodes.* There were also *Hammarbya paludosa, Illecebrum verticillatum, Radiola linoides* and many other interesting species.

Aug. 1: Round and about Weston Bigwood, Portishead. Mr. C. H. Cummins.

This small area yielded an abundance of species, including *Lithospermum purpurocaeruleum, Kickxia spuria, K. elatine, Aquilegia vulgaris* and *Epipactis helleborine.*

Sept. 5: Nettlebridge Valley and Edford. Miss I. F. Gravestock.

Aconitum anglicum still in Stoke Bottom.

Sept. 19: Fungus foray to Leigh Woods. Dr. T. E. T. Bond.

Oct. 11: Fungus foray to Oare Hill. Mr. J. H. Kemp.

I. F. GRAVESTOCK, *Hon. Secretary.*

REPORT OF GEOLOGICAL SECTION, 1970

THE Annual Business Meeting of the Section was held on 21 January, 1970 in the Geology Lecture Theatre of the University. The following officers were elected: President, Mr. D. Hamilton; Vice-President, Mr. C. E. Leese; Hon. Secretary, Mr. A. B. Hawkins; Hon. Field Secretary, Mr. D. Hamilton; Committee, Professor D. L. Dineley, Student President of the University *Geological Society* (both *ex-officio*), Mr. D. Addison, Mr. R. Bradshaw, Mr. A. E. Frey, Miss G. Garland, Mrs. M. Scawin, Mr. R. W. Ashley, Mr. N. H. Hollingsworth.

After the Meeting, the retiring President, Mr. C. E. Leese, gave a lecture entitled 'Cornwall, its geology and its people.' Other lecture meetings were:—

26 February: Recent Movements in New Zealand Geology. Mr. D. Hamilton.

29 October: Coalmining in the Bristol District. Mr. G. A. Kellaway.

26 November: The Bristol Channel, its historical evolution and potential as a source of hydrocarbons. Mr. T. R. Owen.

The following three field meetings took place:—

16 May: The Rhaetic and Lias of Sedbury Cliff, leader, Mr. D. Locke.

19 July: Geology of some road cuttings, leader, Dr. M. L. K. Curtis.

25–27 September: Coastal exposures in S. Pembroke, leader, Dr. P. L. Hancock.

A. B. HAWKINS, *Hon. Secretary.*

REPORT OF ORNITHOLOGICAL SECTION, 1970

"THE WREN
THE WREN
THE KING OF
ALL BIRDS

AT the 46th Annual General Meeting, Messrs. P. J. Chadwick and H. R. H. Lance were elected President and Secretary respectively. Mr. S. M. Taylor was elected Assistant Secretary, and Messrs. W. G. Bigger and J. D. R. Vernon were elected to the Committee, while Miss C. Graham, Mrs. C. E. Hughes and Messrs. A. E. Billett, H. R. Hammacott, A. D. Lucas, J. F. Rowe and D. Warden were re-elected. Mr. Billett was re-appointed Hon. Auditor. Later, Mr. T. B. Silcocks was co-opted to the Committee.

Seven indoor meetings were held, with an average attendance of 54. The subjects and speakers were:

Jan. 16: Reflections of a Random Birdwatcher, by Mr. G. A. Forrest.

Feb. 20: Swans and Swallows, by Dr. C. D. T. Minton.

Mar. 18: Harry Savory's Dutch Bird Slides, by Messrs. P. J. Chadwick and S. M. Taylor.

Apr. 10: The B.T.O. Atlas of Breeding Distribution—Somerset and Bristol Area, a symposium.

Oct. 7: Annual Fieldwork Meeting and Film, Birds of Teesmouth.

Nov. 18: The Hawaiian Goose Restoration Project, by Dr. Janet Kear.

Dec. 11: Joint Meeting with R.S.P.B. Birds of Turkey, by Mr. R. F. Porter.

Field meetings were held at Steart and district (all-day, Apr. 26), Bourton Combe and Backwell Hill (May 7), Ashton Hill Plantation (May 21), Thornbury area (May 18), Clapton Moor (May 23), Abbot's Leigh (June 1), Brockley Combe and Wrington Warren (June 20), St. George's Wharf (July 31), Portland Bird Observatory (all-day, Oct. 4) and Chew Valley Lake (Dec. 27). We thank the leaders and helpers on these occasions, and also those members who have given hospitality to visiting speakers and helped in other ways.

Members contributed to the following field projects: the B.T.O. Nest Record and Ringing Schemes, Common Birds Census, Birds of Estuaries Survey, Atlas of Breeding Distribution, and pilot study of winter transects; and to our own projects on the Birds of Bristol, Starling Roosts, Birds of Prey, Gulls of the R. Avon, Rookeries in S. Glos. and Shelduck. More members, skilled or unskilled, would be welcome to join in any of these activities.

H. R. H. LANCE, *Hon. Secretary.*

REPORT OF MAMMAL SECTION, 1970

At the Annual General Meeting on 15 January, 1970 the following officers were elected: President, Mr. A. F. Jayne; Secretary, Miss E. J. Lenton; Recorder, Mr. R. G. Symes; Library Committee member, Dr. D. H. Peregrine; Conservation Committee member, Mr. A. F. Jayne; Committee, Messrs. R. M. Curber, F. H. Rawlings and G. Walker.

The following field meetings were held:—

Feb. 1: Fox Spotting in Bristol, 4.0—6.0 a.m. Mr. F. H. Rawlings.
Feb. 15: Spaniorum Farm. Miss E. J. Lenton.
Mar. 15: Tidenham Chase. Mr. A. F. Jayne.
Apr. 18: Field Work in the Oxford Area. (Joint General and Mammal meeting). Miss E. Hurrell.
May 10: Ebbor Gorge. Mr. R. M. Curber.
May 22, 29. June 5, 12, 19: Badger watches. Mr. A. F. Jayne.
Aug. 23: Middle Hope. Mr. R. G. Symes.
Sept. 13: Priddy Pools and Stockhill Plantation. Miss E. J. Lenton.
Sept. 25–27: Pembrokeshire week-end. Miss E. J. Lenton.
Nov. 15: Midford. Mr. R. M. Curber.
Dec. 13: Long Wood. Mr. R. G. Symes.

The following indoor meetings were held:—

Feb. 17: The Care of Animals. Mr. D. Packham.
Mar. 10: Film Evening.
Oct. 3: Desert Mammals. Dr. R. J. G. Savage.
Nov. 11: Hedgehogs. Dr. P. Morris.
Dec. 8: Mongooses. Prof. H. E. Hinton.

We were extremely sorry to say goodbye to Mrs. A. R. Holeton when she and her husband left for Canada early in the year. She had been Hon. Secretary to the Section since its formation in 1966 and it owes a great deal to her.

E. J. LENTON, *Hon. Secretary.*

ACCOUNT OF THE GENERAL MEETINGS, 1970

OUR first meeting of the year on January 22 was addressed by the retiring President, R. Bradshaw, on "Atlantis." The various theories as to where this legendary land was to be found were examined, the evidence being strongly in favour of the Minoan theory.

Feb. 5: J. Burton spoke of the "Conservation of British Insects" one branch of conservation often neglected.

Mar. 5: R. Bassindale once more addressed us, this time on the "Marine Life of the Severn Estuary." He explained the transitional zones between fresh and salt water found in various estuaries and the consequent marine life, in particular that of the Severn Estuary.

Mar. 13: Nature films were shown in the Colston Hall and their success was shown by an increase in our membership.

Oct. 1: P. Tolson spoke on "Conservation" based on the 60 miles of the north Somerset coast from Porlock to Portishead.

Dec. 3: R. J. Whitaker, Hydrologist to the Avon River Board gave us an outline of the whole of the work undertaken by river authorities—an aspect of "Freshwater Conservation."

The missing monthly meeting from November was postponed to January 14th, 1971.

G. STERNE, *Hon. Secretary.*

GENERAL FIELD MEETINGS

SIXTEEN field meetings and one social evening were held during the year and proved generally popular. A new and successful venture was a meeting devoted to marine biology. A list of the meetings with leaders and an indication of the things seen is given below. A fuller account is kept in the records of the Field Committee. In the following list the leader(s) is given first followed by the area visited.

Feb. 8: I. H. Ford and A. F. Jayne. Asham Wood and Merehead quarry (near Frome). Fossils, minerals, small mammals and mosses.

Mar. 1: B. King. The Bog of Tregaron (Central Wales). Birds including red kite, hen harriers, whooper swans and many others.

Mar. 6 J. Barratt. Social Evening. Film, "Islands of the Bristol Channel".

Mar. 27: D. A. C. Cullen, C. E. D. Smith, A. F. Jayne. Goblin Combe. Birds, trees, plants, geology, and mammals.

Apr. 18: Miss E. Hurrell. A visit to the field centre for Oxford schoolchildren, a walk through Wytham Woods, and a lecture on weasels by Miss King.

May 8: D. A. C. Cullen. An evening walk from Publow to Lord's Wood. Birds and Plants.

May 31: H. G. Hockey. South Brecon Field Centre, near Glyn Neath. Birds and plants.

June 17: H. G. Hockey. Penhow and Wentwood. Birds and plants.

June 28: Miss R. C. Lee. Birdland, Bourton-on-the-Water; a fine collection of birds, including free-flying macaws, humming-birds, etc. Guiting-Power, a Nature Reserve with a rich marsh flora and bird life.

July 11: A. F. Devonshire. Savernake Forest. A forest park with a very well-documented history.

July 22: Miss R. C. Lee. Canada Combe and Loxton. A rich chalk flora with birds and butterflies.

Aug. 8: Miss C. Groves. Sand Bay, Middle Hope and Swallow Head. Birds and plants.

Sept. 20: Mrs. Hill-Cottingham. Watermouth, near Ilfracombe. Marine Biology.

Oct. 25: H. G. Hockey. Willetts Hill and Caldecott Wood (Brendons). Woods and woodland birds.

Nov. 27: Miss R. C. Lee. Durleigh Reservoir (ducks, gulls, etc.). A walk along the beach from Minehead to Dunster (Shore birds and a water rail).

Dec. 6: B. King. Abbotsbury Nature Reserve (Swans, ducks and gulls). Radipole Lake (Weymouth), Gulls, ducks, etc. and bearded tits.

A. F. DEVONSHIRE, *Hon. Field Secretary.*

Book Review

The Birds of Exmoor by N. V. ALLEN

This 64-page booklet, published by the Exmoor Press at 50p, is one of a series under the Editorship of Victor Bonham-Carter, dealing with various aspects of Exmoor. A three-page essay describes the topography of the region, the number of species and the main habitats. Then come sections on 'Birds of special interest'—raptors, corvids, game birds, cliff-nesting seabirds, waders and ducks, thrushes, finches and warblers, and finally, some rarities. The main part is devoted to the first published check-list of the birds of the Exmoor National Park.

The list includes 244 species or forms, of which 110 breed regularly and 84 are classified as rarities. Each has a short entry, sometimes a single sentence, summarising its status and distribution. In some cases an abbreviated description is added, though the purpose of this is obscure since none is given for many species, common and rare. The reader able unaided to identify Montagu's or Hen Harriers should not need to be reminded that a Hobby is 'much like a minature Peregrine' (a species not itself described, and incidentally wrongly indexed).

Some of the rarity records are doubtful candidates. A few are from Minehead, outside the National Park proper. The Honey Buzzard 'must have been a scarce but regular summer resident in the early part of the last century', but there are no literature records. The author admits that the Golden Eagle was omitted by E. M. Palmer and D. K. Ballance from the standard work, *The Birds of Somerset* (Longmans, 1968), but he includes it on the strength of a sighting described at second hand by E. W. Hendy in *Wild Exmoor.*

Despite these criticisms, those living on or visiting Exmoor will find this a handy little book, well worth the price. The text is enlivened by many bird drawings by Muriel C. Bentley, and includes twenty black-and-white photographs (plus one of Peregrine and chick on the cover), all of the excellent quality we associate with George Young's work.

S. M. Taylor.

OBITUARIES

DOUGLAS GORDON GIBB

Mr. Douglas Gibb's unexpected death on 21st March, 1970, at the age of 57, came as a great shock to his many friends and colleagues. He had been a regular attender at committee and ordinary meetings of the Entomological Section of the Society except when his duties as Supervisor in charge of the BBC's Control Room at Broadcasting House, Bristol, interfered. He had joined the BBC in the early days of the Corporation in 1929.

A keen amateur entomologist, he joined the Society in 1960 and was elected to the Entomological Section's Committee in 1962, of which he was a valued member. He built up a very fine collection of Coleoptera and Lepidoptera, particularly from Gloucestershire. He regularly operated a mercury vapour light trap at his Almondsbury home and in neighbouring areas; the flow of records from this activity has greatly enriched the Lepidoptera reports in the *Proceedings* and our knowledge of the moths of Gloucestershire.

J. F. Burton.

I. R. P. HESLOP

With the death of Ian Heslop on 2nd June, 1970, just before his 66th birthday, the B.N.S. has lost not only one of its longest-serving members, but a leading British field entomologist.

He had a remarkable knowledge of British butterflies, particularly the Purple Emperor and the very rare Large Blue. He discovered several new localities for the latter in S.W. England, including some in the Cotswolds and Somerset, and probably knew more about its distribution than anyone else. His extensive observations of the Purple Emperor were published in 1964 in his monumental book *Notes and Views of the Purple Emperor*, which he wrote in collaboration with G. E. Hyde and R. E. Stockley.

He was also responsible for the much used and valued *Check List of the British Lepidoptera*, now a standard work.

Apart from his entomological knowledge, he was a first class all-round field naturalist, and was a frequent contributor in recent years to BBC programmes.

His widow, to whom we extend our deep sympathy, generously donated his entire collection of British and African Lepidoptera to the City Museum, Bristol.

J. F. Burton.

J. V. PEARMAN

On his retirement from the Customs and Excise in 1951 he went to live at Aston Clinton so that he could carry out research work on the Psocoptera at Tring Museum. He was an authority on Psocidae with correspondents in the U.S.A., France and Germany; shortly before his death he had collaborated in the publication of a book on the Psocidae, published in France. He became a Fellow of the Royal Entomological Society of London in 1927.

G. R. Pearman.

Miss A. M. SAMPSON

Miss Sampson was a member of long standing and was from 1958 to 1969 a member of the Field Committee. From 1958 to her death she was a member of the Botanical Committee.

She led eight botanical and three general field outings.

I. F. Gravestock.

Mrs. G. S. WAKEFIELD

Mrs. Wakefield joined the Society in 1947. She was Field Secretary in 1951 and a member of the Field Committee from 1952 to 1960. She was a member of the Botanical Committee from 1953 to 1961.

She was a very keen and active field botanist and had an extensive knowledge of plants. She led, or helped to lead, thirteen botanical and general field meetings. Her knowledge and helpfulness were greatly missed when her health no longer permitted her to take an active part in Society affairs.

I. F. Gravestock.

EDITORIAL NOTES

METRIC SYSTEM

Metric figures are strongly encouraged in the *Proceedings*, either alone or accompanying Imperial units. Metrication in scientific journals is urged by the Royal Society and preference is being given to the *Système International d'Unités* (SI). The metre is a basic SI unit: centimetre is discouraged, but is, nevertheless appropriate for some purposes, millimetre is officially the next lower unit to the metre and kilometre is the next above.

TYPING OF CONTRIBUTIONS TO 'PROCEEDINGS'

Attention is drawn to a change in the INSTRUCTIONS TO AUTHORS on page 1 of this volume part. All copy must be typewritten with double spacing and good margins—this applies to all parts of the *Proceedings*. This decision was made by the Council of the B.N.S. in order to save expense and delay in printing.

STEEP HOLM TRUST

The papers in this issue on the Vegetation and the Spiders of Steep Holm emphasise the continuing interest in the island and the need for its conservation and its utilisation in education and science. Steep Holm, officially scheduled as a Site of Special Scientific Interest, is situated in the Bristol Channel to the west of Weston-super-Mare and has close historical links with the port of Bristol. The island is 870 metres (half a mile) long by 320 metres (less than a quarter of a mile) wide with its highest point at 78 metres (256 feet), it is made up mainly of Carboniferous Limestone. Steep Holm Trust holds its lease from the Wharton Estate and carries out a wide range of conservation activities; these are notable especially in connection with the famous peonies, the Gull Colony, the Gun Batteries and the 12th century Priory. Parties may visit the island only if accompanied by a leader who will be provided by the Trust. Applications must be made, preferably by early March, to Mrs. D. Mason (Tel.: Bristol 625416).

J. W. Cowie,
28 July, 1971

BRISTOL BOTANY IN 1970

By A. J. Willis

(Department of Botany, University of Sheffield)

THE meteorological records made at Long Ashton Research Station show that 1970 was a year of average weather, in respect of rainfall (total of 34·89 inches), temperature and sunshine. February, March and April were cold months, with many ground frosts, but May and June were warmer than average, June especially being dry and sunny (14·7 hours of sunshine on 6 June, the sunniest day of the year). Spring flowers were late, but rapid growth in May and June compensated for the slow start of the growing season and resulted in normal flowering times during the summer months. The autumn was rather mild, and October and December were very dry, but 6 November was the wettest day (1·34 inches) of the year and November by far the wettest month, with 7·40 inches of rain.

Botanically, 1970 was an outstanding year for the Bristol area. The highlights include the declaration of Leigh Woods as a National Nature Reserve, the appearance of a long-lost herbarium collection made by Dr. A. Broughton, and the rediscovery of two plants on the Somerset peat moors feared extinct; in addition, several species of flowering plants and bryophytes were found new to the Bristol district.

Leigh Woods, on the Somerset side of the Avon Gorge, have long been known as an area of outstanding botanical interest, the semi-natural woodland on the Carboniferous limestone being of considerable age. Apart from the trees (chiefly oaks, ash, wych elm and small-leaved lime) and shrubs, which include many species of *Sorbus*, *S. bristoliensis* and *S. wilmottiana* being Avon Gorge endemics, a large variety of plants, many of them rare in the district, is represented in the rich ground flora of the wooded slopes and the quarry floors (see the chapter on "Vegetation" in *Bristol and its Adjoining Counties* (ed. C. M. MacInnes and W. F. Whittard), Arrowsmith, Bristol, 1955). Part of the woods was given to the National Trust in 1909 by the late Sir George Wills and his gift was added to by other members of the Wills family. The woods have hitherto been managed by a local committee, but with the declaration of a National Nature Reserve comprising 156 acres on 1 December 1970 the management and maintenance will be shared with the Nature Conservancy. The conservation policy adopted seeks to maintain the semi-natural woodland communities for their scientific value and also for their interest to the general public.

Dr. Arthur Broughton was physician to the Royal Infirmary from 1780 to 1786, and while in Bristol was an active botanist, making a number of records, particularly for the Avon Gorge, some of them being the first for the area. Certain of these records were communicated to William Withering and are included in his *Arrangement of British Plants* (3rd edn, 1796). White (*Flora*, 1912) reports that Broughton's collections were bequeathed to the city, but that no trace of them could be found by the City Librarian in 1893. The continued existence of a Herbarium book by Broughton came to light in October 1970 and an account of this book and its significance is given in a separate article in this issue of the *Proceedings*.

Intensive study of the vegetation of the Somerset peat moors by J. K. Hibberd has shown that many of the plants formerly recorded from the area still persist, albeit in only small amounts. Of very special note are his finds of *Drosera anglica*, long since feared extinct, and of *Andromeda polifolia*, once existing in some quantity on the moors, but not recorded there for the last fifty years. The reports of the continued existence of these and other less extreme rarities on the moors are very welcome news indeed, and testify to the persistence over a great many years of exceedingly small populations of plants.

Other notable finds in 1970 include *Sanguisorba officinalis*, new to N. Somerset, two species of Broomrape, *Orobanche picridis* and *O. rapum-genistae*, for which previous records are very sparse, and some not well authenticated, and also the aliens *Xanthium saccharatum* and *Hordeum pubiflorum*, not previously known in the Bristol district. New stations for a number of plants, including *Bupleurum rotundifolium* and *Carex montana*, have also been found by Mrs. J. Appleyard, who has been active in survey studies for the Somerset Flora. Two bryophytes new to Somerset have been recorded this year, *Bryum creberrimum* and *Thuidium recognitum*, and one, *Barbula unguiculata* var. *cuspidata*, is new to vice county 34.

Evidence has come to light of the occurrence of seeds of the Cheddar Pink (*Dianthus gratianopolitanus*) (tentative determination) in beds of Late Pleistocene age in East Anglia, indicative of a wider existence of this plant formerly.

With the death of Mrs. G. S. Wakefield, on 4 March 1970, the Society has lost a long-standing member of the Botanical Section, who did a great deal of work in the table display of plants in the City Museum.

Names of contributors of several records are abbreviated thus:

J.A., Mrs. J. Appleyard
C.H.C., C. H. Cummins
A.F.D., Dr. A. F. Devonshire
I.F.G., Miss I. F. Gravestock
J.K.H., J. K. Hibberd
R.G.B.R., Capt. R. G. B. Roe, R.N.
D.M.S., Dr. D. Munro Smith

Equisetum telmateia Ehrh. Edford, **S.**, *I.F.G.*, and adjoining a hollow in an ungrazed field, Knowle, Bristol, **S.**, *A.F.D.*

Dryopteris carthusiana (Vill.) H. P. Fuchs. In 1969, wood near the disused railway station, Clutton, **S.**, *R.G.B.R.* This fern was previously known as *D. spinulosa* Watt and *D. lanceolatocristata* (Hoffm.) Alston.

Gymnocarpium robertianum (Hoffm.) Newm. This fern, formerly known as *Thelypteris robertiana* (Hoffm.) Slosson, was growing on the wall of an old buddle house (formerly used for storing lead ore), Biddlecombe, W. Horrington, **S.**, *J. A.* (conf. *R.G.B.R.*).

Helleborus viridis L. Wood between Green Down and Chewton Mendip, south-west of Litton, **S.**, *J.A.*

Rorippa islandica (Oeder) Borbás. In pond, Ashton Court, near Bristol, **S.**, *I.F.G.* Margin of Litton reservoir, **S.**, and also rhine in Queen's Sedge Moor between Wells and Glastonbury, **S.**, *J.A.*

Silene noctiflora L. In neglected arable field, West Horrington, **S.**, *J.A.*

Dianthus gratianopolitanus Vill. Two seeds, tentatively determined as belonging to this species, are described (Frances G. Bell, Late Pleistocene Floras from Earith, Huntingdonshire: *Phil. Trans. Roy. Soc.* (1970), B **258,** 347–78) from organic beds of Last-Glacial age exposed in a pit in fluviatile gravel at Earith, at the south-west margin of the East Anglian fens. Radiocarbon dates indicate an age of about 42,000–45,000 years before present. The seeds are 2·6–2·7 mm long, with cells similar in every respect to this species, but differing from the British Cheddar population in being narrower and more tapering to the beak. The seeds occur with the remains of other base-loving plants of open vegetation, and the presence of *D. gratianopolitanus* fits the floristic and ecological character of the Full-Glacial flora.

Sagina nodosa (L.) Fenzl. Old quarry, Ubley Sideling, **S.**, *J.A.*

Spergularia marina (L.) Griseb. Littleton-on-Severn, **G.**, *I.F.G.*

Atriplex littoralis L. North end of Sand Bay, towards Middle Hope, **S.**, *E. S. Smith.* St. Brody noted this plant from Weston-super-Mare (White, *Flora*), and there are more recent records from Brean (*Bristol Botany in 1956*).

Althaea officinalis L. On beach west of Redcliffe Bay, near Portishead, **S.**, *C.H.C.* White (*Flora*) notes its former abundance at Portishead.

Rhamnus catharticus L. Near top of Providence Lane, Long Ashton, **S.**, *Miss B. A. Rake.*

Astragalus glycyphyllos L. Border of wood near arable field, Weston-in-Gordano, **S.**, *C.H.C.*

Lathyrus sylvestris L. On embankment adjoining the Portway below Sneyd Park, Bristol, **G.**, *I.F.G.* and *D.M.S.*

Potentilla anglica Laichard. Goblin Combe, Cleeve, **S.**, *I.F.G.*

Sanguisorba officinalis L. A good stand on banks of disused railway between Cheddar and Westbury-sub-Mendip and also north-west of Lodge Hill Station, **S.**, *J.A.* This is a first record for N. Somerset (v.c. 6), although the plant was first reported for the Bristol area (Earthcott Green, **G.**) in 1939.

Drosera anglica Huds. Almost certainly this species, with leaf blades greater than 2 cm, in a site answering to the "Wedmore turbaries" cited by White (*Flora*, p. 179), **S.**, *J.K.H. D. intermedia* Hayne occurs elsewhere on the moors but the leaf blades never exceed 1·5 cm. Only a very few plants of *D. anglica* were found associated with *Erica tetralix* L., *Eriophorum angustifolium* Honck. and *Sphagnum cuspidatum* Ehrh. This Sundew was feared extinct by White and the present report is the only indication of the existence of the plant in N. Somerset apart from specimens in the Boswell and Stephens herbaria (see White, *Flora*).

Peplis portula L. Persisting on Mendip; by pond, Priddy Circles, **S.**, *J.A.*

Daphne laureola L. One plant near edge of Big Wood, Weston-in-Gordano, **S.**, *C.H.C.*

Epilobium lanceolatum Seb. & Mauri. In 1963, on disused colliery tips, Foxcote, **S.**, and in 1969 on old quarry workings at Downhead, **S.**, *R.G.B.R.*

Callitriche intermedia Hoffm. In stream running towards the old Upper Benter coalmine, between Gurney Slade and Nettlebridge, **S.**, *I.F.G.*

Bupleurum rotundifolium L. By hedge, Beryl, Wells, **S.**, *J.A.* A second record for the Mendip area.

Oenanthe lachenalii C. C. Gmel. One plant on somewhat marshy ground, Whitchurch, **S.**, with *Lathyrus nissolia* L. (two patches), *A.F.D.*

Rumex maritimus L. On old peat cuttings, The Roughet, Shapwick Heath, **S.**, leg. *J.K.H.*, det. *Dr. F. Rose.* This Dock rapidly appeared in quantity in 1969 after ditches had been cut across The Roughet and fruited very well, but there was very little in 1970.

Carpinus betulus L. The principal component of a small isolated wood on Tadham Moor, south of Wedmore, **S.**, on wet peat near the highest point of the original raised bog surface, *C. G. Trapnell.* Hornbeam has a fairly wide tolerance of soil types, but usually occurs on sandy, silty or loamy clays.

Andromeda polifolia L. A small number of plants, some of which were in flower, in a peat bog south of Wedmore, **S.**, *J.K.H.* The Bogbell or Marsh Andromeda was growing with *Calluna vulgaris* (L.) Hull, *Erica* spp., *Eriophorum vaginatum* L. and *Sphagnum papillosum* Lindb., and occurred in six of twenty-five randomly placed quadrats over an area of 15 acres. The last record of this plant for the peat moors, where it was once plentiful, is for August 1920 between Shapwick and Ashcott (*Bristol Botany* in 1948). The present report is a most welcome indication of the persistence of this plant, which was feared extinct, despite the changes in the area due to peat winning and alterations of water level.

Lithospermum purpurocaeruleum L. Still in Big Wood, Weston-in-Gordano, **S.**, by roadside and covered in quarry dust, *C.H.C.*

Atropa bella-donna L. One large plant which fruited well in the same spot as in 1969, Bristol Grammar School, **G.**, *A.F.D.*

Euphrasia tetraquetra (Bréb.) Arrond. In the Gully, Avon Gorge, **G.**, leg. *D.M.S.*, det. *P. F. Yeo.* This Eyebright was previously known as *E. occidentalis* Wettst.

Euphrasia confusa Pugsl. In the Gully, Avon Gorge, **G.**, leg. *D.M.S.*, det. *P. F. Yeo.* A species common on Mendip, and also occurring on the Cotswolds.

Orobanche rapum-genistae Thuill. Four plants of this rare Broomrape on *Sarothamnus scoparius* (L.) Wimm. ex Koch in Greyfield Wood, Clutton, **S.**, *P. A. Hickmott. R.G.B.R.* reports that the flowers of these plants had stamens inserted at the base of the corolla tube, glabrous filaments, stigma lobes distant and pale yellow and a large central lobe of the lower lip of the corolla. Murray (*Flora of Somerset*) lists two localities for this plant in Somerset and White (*Flora*) records the plant from near Wells, but there are no subsequent reports for N. Somerset.

Orobanche picridis F. W. Schultz ex Koch. In 1969, on the south slope of Brean Down, **S.**, leg. *Dr. P. Macpherson*, det. *Dr. D. J. Hambler* (per *Dr. G. Halliday*). This rare species has been earlier reported for the Bristol flora, but the records have not been fully authenticated (see *Bristol Botany* in 1946). A specimen has been put in the Herbarium (*Som. Arch. and Nat. Hist. Soc.*) at Taunton.

Utricularia minor L. This Bladderwort was growing with *Sparganium minimum* Wallr. in a pool on Street Heath, **S.**, *Dr. D. A. Goode* and *J.K.H.* The Lesser Bladderwort flowered freely in this site in 1921, after the great drought; the Small Burreed was reported from Street Heath in 1945.

Mentha × *piperita* L. Margin of reservoir, Litton, **S.**, *J.A.*

Lycopus europaeus L. Stratton Common, **S.**, *C. Hurfurt* (per *I.F.G.*).

Artemisia absinthium L. Persistent in large quantity near Weston Lodge, Weston-in-Gordano, **S.**, *C.H.C.*

Serratula tinctoria L. Cutting of disused railway west of Wookey, **S.**, and by Litton reservoir, **S.**, *J.A.* Also at Edford, **S.**, *C.H.C.*

Lactuca virosa L. In 1969 common on waste ground, where it has been established for some years, Frenchay, **G.**, *D.M.S.*

Hieracium strumosum (W. R. Linton) A. Ley. On St. Vincent's Rocks and in Bridge Valley Road area, Avon Gorge, **G.**, leg. *D.M.S.*, det. *C. E. A. Andrews.*

Hieracium lachenalii C. C. Gmel. Limestone cleft on Mendip, south-west of Compton Martin, **S.**, *J.A.*

Hydrocharis morsus-ranae L. In small pond at about 800 feet on Mendip near Westbury Beacon, **S.**, *J.A.* Common in rhines of the peat moors, but unusual at this altitude.

Potamogeton coloratus Hornem. Rhine on the peat moors near Fountain's Wall, 1½ miles north of Glastonbury, **S.**, *J.A.* (conf. *R.G.B.R.*).

Polygonatum multiflorum (L.) All. A number of fruiting stems in a wood west of St. Catherine's Reservoir north of Charmy Down near the county boundary, **G.**, *C. D. Ralph* (conf. *A. J. Willis*). This plant has been known for more than a century from Charmy Down.

Ornithogalum umbellatum L. Several small clumps, naturalized among grass near old quarry, Goblin Combe, Cleeve, **S.**, *C. D. Ralph.*

Allium oleraceum L. var. *complanatum* (Bor.) Fries. In abundance on the slopes of Durdham Down near the Zoo, Bristol, **G.**, with some *A. carinatum* L., *D.M.S.*

Coeloglossum viride (L.) Hartm. Still on the Shapwick peat moor, where observed in a meadow on Canada Farm, **S**. Some of these cut meadows are rich in orchids including *Gymnadenia conopsea* (L.) R.Br., *Orchis morio* L. and *Dactylorhiza fuchsii* (Druce) Soó, *J.K.H.*

Platanthera chlorantha (Custer) Reichb. Goblin Combe, Cleeve, **S**., *Dr. C. E. D. Smith* (per *I.F.G.*).

Ophrys apifera Huds. Lodge Hill, Westbury-sub-Mendip, **S**., and on Mendip about two miles south-west of Compton Martin, **S**., *J.A.*

Cladium mariscus (L.) Pohl. A very small quantity in an area of swamp carr near the railway south-east of the former Shapwick Railway Station, **S**., *J.K.H.* The plant was discovered near Shapwick Railway Station in 1915 (see *J. Bot.* 1918, 63). Several patches of this conspicuous and rare sedge now exist on the peat moors, a welcome situation in view of the lack of records of this plant last century, and the single small colony known to White (*Flora*).

Carex montana L. In limestone grassland south-west of Compton Martin, **S**., some distance from the Charterhouse station of this rare sedge, *J.A.*

Catabrosa aquatica (L.) Beauv. Small pool on hillside, north-east of Westbury-sub-Mendip, **S**., and in pool in field near West Horrington, **S**., *J.A.* (conf. *R.G.B.R.*).

Calamagrostis epigejos (L.) Roth. Long Wood, near Charterhouse, **S**., *J.A.* (conf. *A. D. Hallam*).

ALIENS. *Papaver lateritium* C. Koch. Growing as a garden weed on old walls in Clifton, Bristol, **G**., *D.M.S.*

Erucastrum gallicum (Willd.) O.E. Schulz. In 1969, in weedy arable land near Mells Road Station, **S**., *R.G.B.R.* The only previous record of this plant for N. Somerset is from waste ground opposite Clarendon Road, Weston-super-Mare, 1935, *J.P.M. Brenan*, ms.

Rapistrum orientale (L.) Crantz. In quantity along the Portway below Sneyd Park, Avon Gorge, **G**., *D.M.S.*

Linum usitatissimum L. On waste ground between Bedminster Down and railway, Bristol, **S**., *A.F.D.*

Crataegus orientalis Pall. ex Bieb. On peat drove near Canada Farm, Shapwick, **S**., *C. G. Trapnell.* This tree was recorded (as *C. Azarolus* L.) from Shapwick Moor in *Bristol Botany* in 1920 and 1921 and noted as still there in *Bristol Botany* in 1942.

Oenothera erythrosepala Borbás. On spoil heaps near Middle Bridge, between Portishead and Clapton-in-Gordano, **S.**, *C.H.C.*, with *Senecio viscosus* L. Also on waste ground north-east of West Horrington, **S.**, *J.A.*

Euphorbia uralensis Fisch. ex Link. Waste ground, Wookey Station, and by the disused railway line, **S.**, *J.A.* This spurge, previously known as *E. virgata* Waldst. & Kit., was reported from Wookey Station in *Bristol Botany* in 1945.

Polygonum amplexicaule D. Don. A garden escape, with *Brunnera macrophylla* Johnston, at border of wood along the Portway, Avon Gorge, **G.**, leg. *D.M.S.*, det. *Dr. J. Timson.*

Rumex obovatus Danser. A wool alien from a tip east of Cradle Bridge between Sharpham and Glastonbury, **S.**, *C. A. Howe*, det. *J. E. Lousley.* Known formerly at Avonmouth Docks, **G.**, see "The Adventive Flora of the Port of Bristol" (*Bot. Exch. Club Rep.* 1932).

Cyclamen hederifolium Ait. Established for at least 13 years on grassy track adjoining small wood below Sneyd Park, Bristol, **G.**, *D.M.S.*

Datura stramonium L. A few plants, together with the purple-flowered form, on broken ground in a pasture, Wraxall, **S.**, *R. W. Alvis* (per *Dr. T. E. T. Bond*). Also in field on Weston Down near Portishead, **S.**, *C.H.C.*

Veronica filiformis Sm. On waste ground, with *Borago officinalis* L. and *Crocosmia* × *crocosmiflora* (Lemoine) N.E. Br. above Redcliffe Bay, near Portishead, **S.**, *C.H.C.*

Xanthium saccharatum Wallr. A wool alien from a tip east of Cradle Bridge, between Sharpham and Glastonbury, **S.**, *C. A. Howe*, det. *Professor F. J. Widder* of Graz. A first record for the Bristol area.

Anaphalis margaritacea (L.) Benth. With *Orobanche minor* Sm. and *Chaenorhinum minus* (L.) Lange, on waste ground near St. Mary Redcliffe, Bristol. Also plentiful in the area between the Avon and the Floating Harbour, **G.**, is *Cheiranthus cheiri* L. and *Petroselinum crispum* (Mill.) Nyman, *A.F.D.*

Hieracium speluncarum Arv.–Touv. One fine plant of this rare Hawkweed at the junction of Elton Road and Elmdale Road, about 200 yards from the well-known locality on Richmond Hill, Clifton, Bristol, **G.**, *A.F.D.*

Juncus tenuis Willd. On roadside verge, Chilcote, Wells, **S.**, *J.A.* (conf. *R.G.B.R.*).

Triticum turgidum L. Along the Portway, Avon Gorge, **G.**, *D.M.S.*, det. *Dr. C. E. Hubbard.* This cultivated cereal is Rivet or Cone Wheat.

Hordeum pubiflorum Hook. f. A wool alien on tip east of Cradle Bridge, between Sharpham and Glastonbury, **S.**, *D. A. Howe*, det. *J. E. Lousley.* A first record for the Bristol district.

Avena fatua L. var. *pilosissima* S. F. Gray. Along the Portway, Avon Gorge, **G.**, *D.M.S.*, det. *Dr. C. E. Hubbard.*

BRYOPHYTES. Barbula unguiculata Hedw. var. *cuspidata* (Schultz) Brid. In 1966, Stapleton, near Bristol, **G.**, leg. *D.M.S.*, det. *A. C. Crundwell.* New to v.c.34.

Grimmia orbicularis Bruch ex Wils. St. Vincent's Rocks, Avon Gorge, Bristol, **G.**, leg. *D.M.S.*, det. *Dr. A. J. E. Smith.*

Bryum creberrimum Tayl. Wall, Englishcombe, **S.**, *Dr. J. L. Dobbie* (conf. *Dr. E. V. Watson*). This moss is new to Somerset.

Thuidium recognitum (Hedw.) Lindb. Limestone boulder, wood east of Ebbor Gorge, **S.**, *J.A.* A first record for this moss in Somerset.

Brachythecium albicans (Hedw.) B., S. & G. On turf near Bridge Valley Road, Avon Gorge, **G.**, leg. *D.M.S.*, det. *J.A.*

I am indebted to all those who have supplied records, and especially Captain R. G. B. Roe and Mr. C. G. Trapnell; to Mrs. J. Appleyard and Mr. P. J. M. Nethercott for help with the records; and to Mrs. C. H. Perry of Long Ashton Research Station for the supply of meteorological data.

BRISTOL BIRD REPORT 1970

Compiled by the Editorial Committee of the
B.N.S. Ornithological Section

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In some unexplained fashion, the Owl entries vanished from the 1969 Report during the last stage of production. We apologise, and include them below with the 1970 entries.

We again express our thanks to all contributors. Only a fraction of the records received can be cited individually, but all are carefully studied and are kept for future use. Even where brief summaries must suffice to deal with tens or hundreds of records, as with some of the commoner waders, the accuracy of the picture depends on the details that have been received. We urge our readers, therefore, to maintain the flow of information about the commoner as well as the more uncommon birds they see, and we remind them too of the value of *negative* data—notes of the absence of species from areas, or at seasons, where or when they would be expected.

We have referred before to the problem of giving significant accounts for those species which are neither very common nor particularly uncommon (see especially our 1967 Report). As a step towards a solution, tentative analyses are being made of accumulated data, and special studies mounted in an attempt to fill in the gaps disclosed.

The Year. The first week was cold; Bewick's Swans, already numerous at the New Grounds in late 1969, built up to a record total as their midland wintering areas froze. The rest of January was wet and mild, with mainly S.W. winds. Heavy and widespread Lapwing movements to the N.E. from the 11th–15th were no doubt a reversal of the cold-weather movements of early December. The White-fronted Goose flock at the New Grounds reached the largest size on record near the end of the month. The district had its share of wintering Blackcaps and Chiffchaffs, which an enquiry by the British Trust for Ornithology showed to be present nationally in unprecedented numbers, chiefly in the south-west. February became progressively colder until the 16th, when heavy snow fell in S. England, to be followed by milder weather with rain and strong

S.W. winds. From the end of the month to mid-March, N. winds brought night frosts and inland snow showers, and early arrivals of migrants were few. A week of milder weather merely heralded a return of the cold. A Red-necked Grebe spent a fortnight at Cheddar and on Mar. 27th a Kentish Plover was seen at the New Grounds—our third record (the others were at the same place in 1960 and at Severn Beach in 1947).

A Lesser Yellowlegs at the New Grounds from April 2–27 was seen by many, including visitors to the Annual Conference of the British Ornithologists' Union, held in Bristol from the 10th–12th. It was the first Glos. record of this N. American wader, and the second for the Bristol district, one having been seen at Chew Valley Lake in 1967. From about April 11, warm S. winds brought the main migrant stream, and with it a remarkable number of vagrants. An Alpine Swift at the New Grounds on the 16th, the first authenticated Glos. record, was one of seven seen in the country; and a Purple Heron at Chew was part of a widespread minor invasion of *Ardeidae* species. It was Somerset's second, the first having been seen at Blagdon in 1963.

April ended cold, but the first week of May was fine and warm. Then came ten wet and thundery days, until high-pressure systems from Biscay to Scandinavia brought settled fine weather, with winds first easterly and then westerly. From late April to early June, Kittiwakes in some numbers were seen in the Estuary, and there is evidence that this is now a regular pattern. Very few Curlew Sandpipers were observed in the country on the Spring passage, but one of these was at the New Grounds on May 9—only our eighth or ninth Spring record in twenty years. Single Little Stints were seen at the New Grounds and Severn Beach after movements in E. England. Little Gulls were more plentiful than usual; of some 70 recorded in the country, at least six were at Chew. A huge but brief Black Tern passage early in May brought small parties to S. Wales and N. Somerset. May also saw a widespread influx of Quail; locally there were scattered passage records, and in June over thirty males were heard, considerably more than usual. A Red-rumped Swallow at St. George's Wharf on June 7 was the country's third of the year, and the first ever recorded in Somerset or in our district. Whitethroat numbers varied; in some places they were still clearly short, but in others they had made a good recovery from the disaster of 1969. It seems likely that the birds concentrated first in the most suitable sites, as was shown for the Wren after the 1962-3 winter (Williamson, K., 1969, *Bird Study*, **16**, 53–59).

The fine weather persisted to June 20, but then became less settled. July and August were very changeable; a particularly wet spell from Aug. 7–15 caused local flooding, but otherwise rainfall was not great. The first three weeks of September were also unsettled, with periods of heavy rain. The fine spell in May and June appears to have resulted in a good breeding success for many species. Throughout the summer, Manx Shearwaters were seen in the Channel in unusually large numbers and, especially after summer gales, Fulmars and Gannets were seen more often than usual. The autumn passage of Black Terns was considerable, including the high count of 80–90 at Chew on August 2. Eleven White-winged Black Terns recorded in the country in August, and seven or so in September, included one in each month at Chew, our eighth and ninth records. Chew Valley Lake also held a notable concentration of Gadwall—245 on August 11th; this is the third successive year that over 100 have gathered before dispersing. Whimbrel appeared to be scarce on autumn passage, as indeed had been the case in the spring; but Grey Plover were more often seen than usual, as they were too in 1969. Our autumn Curlew Sandpiper passage followed the national pattern—more than normal, but far fewer than in 1969, and mostly seen after August 22. Of fifteen or so Temminck's Stints recorded nationally, one—our first since 1964—was at Cheddar reservoir.

Westerly gales in September brought to the British Isles an assortment of American waders and gulls. Of these a Pectoral Sandpiper at Chew was our eleventh, while a Sabine's Gull (one of some thirty in the country) at Chew on the 6th was the eighth record for the district. The gales brought petrels, shearwaters, skuas and auks to the Estuary, and some birds were found driven inland. The last ten days of September were fine and warm, with mainly S. and W. winds. With October came more strong N. and N.W. winds, changing to S.W. and then, briefly from the 19th, to strong to gale force northwesterlies again; the rest of the month was quiet and warm, with winds locally mainly S.W. The westerlies brought more American waders, including numbers of Buff-breasted Sandpipers, of which one, at Cheddar res. on Oct. 17 and 18, was the second for the district, the first having been at the New Grounds in 1961. Another, reported on Oct. 7 from Steart, outside our area, was Somerset's second, one having been at the same place in 1966.

November was one of the mildest and wettest known, with temperatures up to 60°F in the last week. December too was mild and dry until the 21st, when fresh N. winds brought frost and then snow, continuing to the end of the year. The mild weather caused Swallows and House Martins to linger in many places, and Blackcaps were present locally in probably the greatest numbers ever. The autumn concentration of Great Crested Grebes at Chew, which has been increasing steadily since 1965, reached the unprecedented level of 490 in November, some 150 higher than the previous highest count. Winter flocks of Whitefronts and of Bewick's Swans both showed evidence of a good breeding season, the best known in the case of the former species. Bewick's Swans appeared in considerable numbers in N. Somerset. Among the ducks, Pintail, Shoveler and Pochard were less abundant than normally. For the first time since the war, the year passed with no records of Diver species in the district.

Escapes from Captivity. Considerable interest can be aroused when exotic species, escaped from aviaries or zoos, are observed in the wild. The most recent examples to come to our notice are as follows. In 1969 a Sarus Crane and in 1970 a Crowned Crane in Somerset, S. of our area but seen by many members; in 1969 a Giant Whydah, and in 1970 a Scarlet Cardinal, both in N. Somerset; and in the latter year, in S. Glos., a Baglafecht's Weaver and, not far away, a nest, built in the wild, which was identified by Dr. J. H. Crook of Bristol University, an expert on the weavers, as a typical nest of the Village Weaver.

Changes in Habits and Habitats. The presence of hunting Kestrels alongside the embankments of motorways and other main roads is increasingly reported. The elm disease, caused by the fungus *Ceratocystis ulmi*, which is spread by the beetles *Scolytus scolytus* and *S. multistriatus*, is spreading into the area. Outbreaks have been reported in the Berkeley Vale and Sodbury Vale, and instances have been seen in N. Somerset. The disease kills the elm trees attacked, and could have a considerable effect on the Rook population since the elm is our commonest hedgerow tree and is the species most often holding Rookeries. Rooks have built in diseased trees, but it is not yet clear whether the failure of the trees to produce leaves will affect the birds' behaviour or their breeding success.

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The initials **G.** and **S.** denote respectively the South Glos. and North Somerset parts of the district. Where neither is used, the entry is a general statement about the whole area. The boundaries are defined below on page 45. Prior to Jan. 1, 1968, the area was slightly smaller, as defined in *Proc. B.N.S.*, 1960, p. 114.

Great Crested Grebe *Podiceps cristatus*

Bred: **G.**—Frampton Pools (five or six pairs), Tortworth Lake; **S.**—Orchardleigh (two pairs), Emborough, and Blagdon and Chew Valley resrs. (over 100 young at latter). Large autumn counts include 490, Chew Valley, Nov. 21 (RA) but only 340 on 29th and 260, Dec. 28.

Red-necked Grebe *Podiceps griseigena*

S. One, Cheddar res., Mar. 19–Apr. 4 (PJC, NTL, JAMCG, BR).

Slavonian Grebe *Podiceps auritus*

S. One, Cheddar res., Nov. 29–Dec. 28 and one, Chew Valley, Dec. 20 (PJC, SBE *et al.*).

Black-necked Grebe *Podiceps nigricollis*

S. Chew Valley res.: one, Mar. 30–early Apr. (BR *et al.*) and two, Oct. 17 (GBB). Cheddar res.: one, Oct. 5–Nov. 7 but two, Oct. 24–Nov. 1 (RMC, BR *et al.*).

Storm Petrel *Hydrobates pelagicus*

S. Three off Sand Point, Sept. 10 (TB).

Manx Shearwater *Puffinus puffinus*

Large numbers in Channel, midsummer: 11 reports totalling 324 birds, most off Brean Down (74, June 4; 66 on 5th; 38, July 12 and 97 on 15th) but two parties of nine off Sand Point and one of 19, June 6–Aug. 3rd. A gale-driven bird was found at Stroud, Sept. 20. (RA, TB, PJC, BR, WT)

FULMAR *Fulmarus glacialis*

S. Single birds, Sand Bay, Feb. 3, July 2, Nov. 3 (TB); Cheddar res., Feb. 22 (BR) and Chew Valley res., May 31 (SBE). Also noted off Brean Down on eight dates, Apr. 28–July 15, with two, May 17 and June 5 (RA, BR).

GANNET *Sula bassana*

Twenty-three records, involving 78 birds; majority in Channel off Brean Down, usually one or two birds but 34, July 15. Gale-driven birds found dead or dying on coast as far N. as Sharpness, and one taken to WT from near Gloucester. One in flight, New Grounds, Dec. 23 (MAO, BR, JDRV *et al.*).

CORMORANT *Phalacrocorax carbo*

Up to three, Frampton Pools, Jan.–Feb. and one, October. Some 20 records of one or two birds on coast, but sometimes up to four at Severn Beach. Seven flying E, Rudgeway, Jan. 11 and two to N, Bath, Apr. 1. Regular at reservoirs–max. counts 19, Cheddar, Jan., and 18, November; and 22, Chew Valley, March–April, but up to 39 in December.

HERON *Ardea cinerea*

Evidence of sharp increase in breeding population, with total of 80 nests, including one small new heronry (JFB, DW *et al.*) Regular in small numbers on reservoirs, moors and coast; 15 Frampton on Severn foreshore, Aug. 15 (JMLP *et al.*).

PURPLE HERON *Ardea purpurea*

S. One, Chew Valley res., Apr. 20–May 3 (RA, AH *et al.*). Deep neck pouch noted in flight; light brown wings with dark primaries; dark streak on yellow-brown neck (RA). Record, second for County, accepted by *Brit. Birds* Rarities Committee.

BITTERN *Botaurus stellaris*

Single birds, Frampton Pools, Feb. 7 (EEJ, MAO) and Chew Valley res. on several dates (GBB, PJC, BR *et al.*).

TEAL *Anas crecca*

Approx. 650 along coast, mid-Jan. Autumn/winter total hard to assess due to marked fluctuations in numbers at resrs. and lack of synchronisation of counts. About 450 in area, mid-Sept., with marked influx end month (400, Frampton, Oct. 3, 18)—probably about 1,000 present, mid-Oct., but decrease to 700 later.

GARGANEY *Anas querquedula*

G. Two pairs, New Grounds, Mar. 24–28 and pair, Apr. 3–13. Male, Frampton Pools, May 16–19.

S. Pairs, noted, Chew Valley res., Apr. 5 and July 1, and a male, Aug. 16 and 30th. Cheddar res.: pair, Apr. 7; seven, Aug. 3; five on 4th, one on 27th and three on 28th. Male, Blagdon res., Aug. 23.

Gadwall *Anas strepera*

G. Peak counts, Frampton area: 24, Jan. 3; 18, Feb. 21, Aug. 15 and Oct. 3, rising to 42 on 10th and 75 on 28th; 20, Nov. 15.

S. Small numbers, resrs., Jan.–Feb., but influx in March; also one on coast (St. George's Wharf), Mar. 8. At least 12 pairs bred, Chew Valley res.; record totals there in Aug.—245, Aug. 11; 200 on 21st, 180 on 25th, then rapid decrease to *c.*30, end Sept. Up to 20, Cheddar res., Sept.–Nov. (25, Oct. 17); a few also at Blagdon, Chantry and Orchardleigh.

Wigeon *Anas penelope*

No really large numbers, Jan.–Mar.; one stayed to end May. First autumn birds from Aug. 22. Approx. 150 in total, end Sept.; 450, mid-Oct.; 600, end Nov., but 3,400 Dec. 28 and 29th.

Pintail *Anas acuta*

A very poor year—largest counts of 36, Frampton Pools, Jan. 3; 41, New Grounds, Oct. 28 and 20, Blagdon, Dec. 19.

Shoveler *Spatula clypeata*

G. Max. counts: 120, Frampton Pools, Jan. 27 and 70 on coast, Apr. 2. No large autumn totals.

S. Largest numbers were again at Chew Valley res.—up to 150, in Jan.—where some 10 pairs were noted in mid-summer, and at least one pair bred. Approx. 150 in area, mid-Oct., increasing to 275 in mid-Nov., but down to 125, mid-December.

Red-crested Pochard *Netta rufina*

Frampton Pools: three, Feb. 8–22 and two, Mar. 14–Apr. 26 (EMA, MML *et al.*). Chew Valley res.: one, Aug. 10; two, Aug. 14–Sept. 10, then one to Oct. 4 (GLB, DW *et al.*). Three imm. males, Cheddar res., Aug. 31 (PJC, JAMCG, BR). [Probably all escapes—*Eds.*]

Scaup *Aythya marila*

G. Up to three, Frampton Pools, Jan., and one or two males, Feb. to mid-May (TDE, CMS *et al.*).

S. Male, Cheddar res., Jan.–Mar. 30 with second bird, Jan. 9–Mar. 27; male again present, Oct. 11—end year (RMC, JAMCG *et al.*). Single male, Chew Valley res., Feb. 28–May 30 (RA, WLR *et al.*), and female, Oct. 25–Nov. 14 (SBE). Female off Brean Down, Apr. 15 (GBB).

Tufted Duck *Aythya fuligula*

Area total *c.*800, Jan.–mid Feb. (of which up to half were at

Frampton Pools) and *c.*600, mid-Sept., rising to *c.*800 by end of year. Breeding reported, Frampton Pools (six broods), Chew Valley res. (at least 13 broods), Blagdon res. and Orchardleigh.

POCHARD *Aythya ferina*
Generally a poor year, especially in autumn, when highest single count was 450, Cheddar res., and area total probably did not exceed 750. Bred successfully, Chew Valley reservoir.

GOLDENEYE *Bucephala clangula*
Distribution similar to 1969, with *c.*45 in Jan., 35 in Feb., 60, Mar. 14 and *c.*45, mid-April; last record, May 30. First autumn birds, Oct. 17; total of 25–30 by mid-December.

LONG-TAILED DUCK *Clangula hyemalis*
S. Bird noted, Cheddar res., end 1969, stayed till Feb. 22; joined by ad. ♀ which stayed to Mar. 15 (HRHL *et al.*). Female, Blagdon res., Apr. 12 (SBE) and Chew Valley, May 5–17 (RMC, RH *et al.*).

COMMON SCOTER *Melanitta nigra*
Noted all months except Sept. and Dec., usually one or two, but parties of five, Sand Bay, Jan. 2 (BLK), off Brean Down, Apr. 28, May 15 and eight, June 27 (BR). Passage movement, end March—13 off Brean Down, 29th (BLK) and 35 (23♂♂) on 30th (PJC, PGF). One, Chew Valley res., Mar. 30 and six, Cheddar res., July 4 (BR).

RED-BREASTED MERGANSER *Mergus serrator*
G. Three (1 ad. ♂), Frampton Pools, Nov. 25 (LPA) and single females, Dec. 8–21 (JMLP, JDS *et al.*), and on coast, Dec. 14 (LPA).
S. Four, Sand Bay, Jan. 4 and one on 6th (TB). Two, Chew Valley res., Jan. 14; three, Feb. 14 (RA) and one, Dec. 5–13 (TRC *et al.*).

GOOSANDER *Mergus merganser*
G. Frampton Pools: three (1 ♂), Jan. 18–Feb. 3, then two to Feb. 22 (RKB, MAO *et al.*).
S. Two, Cheddar res., Jan. 4 and one on 9th (BR). Three Orchardleigh, Jan. 24 (RMC). Total of 15, Blagdon and Chew Valley resrs., Feb., and 11, Mar. 15; last seen—pair, Apr. 9 (RNC, HRHL *et al.*); birds moved between resrs., with up to four at Blagdon. Autumn: three, Chew Valley res., Nov. 8; seven there, Dec. 12 and six to 27th (WGB, GLB *et al.*), but 11 on 28th after snow (PJC). Two, Blagdon res., Nov. 17–22 (TRC, RGT).

SMEW *Mergus albellus*
S. One, Cheddar res., Jan. 4 (BR). Up to three (1 ♂), Chew Valley res., Jan.–Mar. 15; one male, Dec. 25–29 (GBB, PLG *et al.*).

NORTH AMERICAN RUDDY DUCK *Oxyura jamaicensis*

G. One pair again bred, Frampton Pools, where up to five adults seen, end March.

S. Cheddar res.: four, Jan. 4; 11 on 9th and five on 11th. Forty-two, Chew Valley res., Jan. 3, and total of 45, there and at Blagdon res., Feb. 15. Few spring or summer records, but total again increased, Nov.–Dec., with 45, Dec. 28 (17 at Blagdon).

SHELDUCK *Tadorna tadorna*

Breeding season survey showed *c.*160 ads. and 92 pulli, New Grounds to R. Avon, June 20–21 (mostly in New Grounds area), and *c.*245 ads. and 121 pulli, R. Avon to Birnbeck I., June 21; as is now regular, other broods appeared later. Pair bred, Chew Valley Reservoir.

GREYLAG GOOSE *Anser anser*

G. The following reported, without descriptive comments: one, New Grounds, Feb. 28; ad., 3 imms., Frampton Pools, for three weeks in July, and 2 ads., 4 imms., Aug. 15 (TDE); two, same place, Dec. 1 (GBB). We stress again that full-winged birds move between the Wildfowl Trust and Frampton Pools.—*Eds.*

WHITE-FRONTED GOOSE *Anser albifrons*

G. New Grounds: end–1969 total of 3,650 rose to record 7,600 on Jan. 26; 6,000 present, Feb. 4, and 5,500 on 20th; over 2,000, Mar. 5 but only 200 on 8th, and last four left on 24th. Autumn: first birds, 11 on Sept. 29, increasing to 1,250, Dec. 18 and 3,850 on 29th (MAO, who reports 43% young birds and ave. brood of 3·0 —best breeding results yet recorded). Elsewhere: 80 and 20 over Filton, early Jan.; seven, Severn Beach, Feb. 1 and 13, Dec. 25; 40, Leonard Stanley, Feb. 9; 10, Chittening, Nov. 7.

S. Records include: ten, R. Axe marshes and 13, Brean Down, Jan. 3–4; 19, Sand Point, Jan. 4; 17, Cheddar res., on 9th; 60, Chew Valley res., on 11th; and several parties of 25–35, resrs. and coast, mid Jan.–mid March; 14, Sand Point, Dec. 23 and 16, E. Horrington on 26th.

LESSER WHITE-FRONTED GOOSE *Anser erythropus*

G. New Grounds: ad. with *albifrons*, Mar. 1 (JAB)—only sighting; another ad., with *albifrons*, Dec. 13–31 (JAB, PLG, PS *et al.*).

BEAN GOOSE *Anser fabalis*

G. New Grounds: one with *albifrons*. Feb. 1 (PLG) and one, Mar. 4–24 (LPA); four (probably family party), Dec. 31 (PS).

PINK-FOOTED GOOSE *Anser brachyrhynchus*

G. Four, New Grounds, Jan. 4, and five on 16th (MAO, WT). No autumn records.

Dark-breasted Brent Goose *Branta b. bernicla*
Ad. with Whitefronts, New Grounds, Jan. 4, 28 (MAO, GBB) and two, ad. and imm., on 16th (MAO). Three flying off Brean Down, Jan. 31 (CG).

Barnacle Goose *Branta leucopsis*
Up to four with Whitefronts, New Grounds, Jan.–Feb. (RMC, TDE, MAO), and one with Canada Geese, Dec. 1 (GBB). One, Woodspring Bay, Jan. 11 (GW). Party of eight on coast, Clevedon, Dec. 26–29, one being seen to die and another shot (JFB, RC).

Canada Goose *Branta canadensis*
G. Frampton Pools: max. counts 68, July 11, and 80, Oct. 26. New Grounds: 84 flying upstream, Jan. 5; 110 present, Nov. 19, and 20 on Dec. 1—no doubt of Frampton Pools origin.

Whooper Swan *Cygnus cygnus*
G. New Grounds: three (1 juv.), Jan. 28–Feb. 15; one ad. and juv., Feb. 16–Mar. 3; pair, Dec. 22–31 (WT).
S. Two, Chew Valley res., Jan. 13 (GLB). Two ads., Cheddar res., Feb. 19 (JAMCG); four ads., Stoke Moor, Mar. 1 and two, Nov. 8–19 (TRC, BR).

Bewick's Swan *Cygnus columbianus*
G. Over 300 fed regularly in W.T. enclosures, Jan., with 404 (record total) on 8th; 570 different birds identified by bill markings by Mar. 18, when last 31 birds left. First autumn arrivals—four, Oct. 4; rapid rise to *c.*155, end–Nov., 220, Dec. 14 and 332 on 31st, by which time 472 individuals identified including 18% juvs.—best breeding success for four years (WT). One, Severn Beach, March 8, and one flying N., Sharpness, Nov. 7.
S. Small numbers at resrs., Sand Point and Stoke Moor, winter. First autumn birds: two, Cheddar res., Oct. 29 where three present, Nov. 8–14 and fifteen on 21st. Large numbers at Blagdon and Chew Valley resrs., incl. 90, Dec. 3 (76, Blagdon) and 102 on 28th (69, Blagdon), two of which had WT dye marks.

Buzzard *Buteo buteo*
G. Reports in breeding season from Cromhall and the Severn Vale. Winter records from Dursley.
S. Breeding season reports from Mendip localities, Blagdon res., Cleeve and nr. Bath. One young reared at one site (PJC) and probably bred at three others (PJC, BR, GS). Autumn and winter records from Brean Down, Winscombe, Portbury, Flax Bourton and Failand.

SPARROWHAWK *Accipiter nisus*

G. Reports, April–July, from Frampton Pools (KJ), nr. Berkeley (JDRV), Cromhall (JH), Tortworth (JH), Elberton (JDRV), Marshfield (PLG) and Clifton, Bristol (PJC).

S. Records from many localities, including Bristol, in breeding season. Female incubating three eggs, June 17–Aug. 3, when only two in nest; shell of third, beneath tree, seemed abnormally thin so eggs were taken under licence for analysis (DW).

MARSH HARRIER *Circus aeruginosus*

S. One, Chew Valley res., Jan. 11 (MS).

OSPREY *Pandion haliaetus*

G. One, Woodchester Park, June 8, 9 (RP *et al.*).

HOBBY *Falco subbuteo*

G. Single birds, New Grounds, May 6 (EEJ) and Stroud area, several dates in July (SMB).

S. Probably bred, one site, where three birds seen, Sept. (per RMC). One, sometimes two, Chew Valley res., May 14–Sept. 5 (PJC, DW). Single birds, Woodspring Bay, June 9 (TB); Worlebury, Aug. 5 (TB); Blagdon, Aug. 30 (PJC); Priston, Sept. 2 (HHD) and Newton St. Loe, Sept. 11 (BK).

PEREGRINE *Falco peregrinus*

G. New Grounds: female, Jan.–mid. April and male, Apr. 3; female, Oct. 4–end year (RMC, TDE, MAO).

S. One, Brean Down, Sept. 16, Dec. 6 and 29th (RA, BR). One imm., St. George's Wharf, Nov. 1–Dec. 1st (GBB, WGB).

MERLIN *Falco columbarius*

G. At least one present, Chittening—Severn Beach, Feb., and Oct. —Dec. (JFR, GY).

S. Sand Point: ♂, Jan. 8 (TB); ♀, Aug. 27, Nov. 26 and Dec. 26 (TB). One, Brean Down, Oct. 3 (RMC).

KESTREL *Falco tinnunculus*

S. Pairs recorded in breeding season—Brean Down, *Weston-s-Mare, Bleadon Hill, *Cheddar res., *Blagdon, *Goblin Combe, *Queen Charlton, nr. Marksbury, Pensford, Cleeve, *Whitchurch, *Nailsea, Ashton Park, St. George's Wharf and *North Stoke, nr. Bath.

Breeding proved at localities preceded by *.

RED-LEGGED PARTRIDGE *Alectoris rufa*

S. Up to three, Sand Point/Sand Bay, Mar. 15–July 9 (RA, TB).

PARTRIDGE *Perdix perdix*

G. Covey of six, Wotton-u-Edge, Feb. 3. Pair, Cromhall, May.

Ten, Earthcott, autumn. Two pairs bred, W. Littleton, and twenty present, end of year.

S. Three pairs, Easton-in-Gordano; one with brood of 12, July 10. Breeding season reports from six other localities. Coveys of ten, Nailsea Moor, Sept.–Oct.; six, St. George's Wharf, Nov.–Dec.; and nine, Kenn Estuary, Nov. 22.

QUAIL *Coturnix coturnix*

G. Twenty-seven heard calling, Marshfield–Tormarton area, June, during Corn Bunting survey (ADL *et al.*) Eight calling, Marshfield, July 16 (PLG).

S. Single birds, Sand Bay, Middle Hope, Clevedon, Nailsea, May–early Sept.; several, Charterhouse and King Down and Yoxter Farms, Mendip, June; five heard, latter place, Aug. 7 (NTL).

WATER RAIL *Rallus aquaticus*

Breeding season records: one, Chew Valley res., July 29 (HRHL) and five, Sand Bay, Aug. 20 (TB). Noted in low-lying coastal districts, Jan.–Mar., Sept.–Dec.; up to four, Chew Valley res., Mar., Aug.–December.

CORNCRAKE *Crex crex*

S. One calling, Kenn Moor, June 1 (JFB).

OYSTERCATCHER *Haematopus ostralegus*

G. Up to eight, New Grounds, May and July 20–Aug. 27.

S. Noted, coast, Jan.–May 6 and July 3–Dec.; up to 25, Sand Bay–Weston Bay area, with 130, Axe Estuary, Nov. 5 (RA); elsewhere, fewer than ten birds. One, Chew Valley res., Mar. 14, and one or two, there and at Cheddar res., Aug.–Sept.

LAPWING *Vanellus vanellus*

Breeding or breeding behaviour, North Stoke, Kenn Moor, Clevedon, Kingston Seymour. Very large and widespread weather movements to N.E., Jan. 11–15 and to S.W., Dec. 26–27. Flocks of 3,000, Old Sodbury, Aug. and Axe Estuary, Feb. and Nov.

RINGED PLOVER *Charadrius hiaticula*

100 records (68 in **G.**), coast, all months. 100, Weston Bay, Jan.; up to 100, Chittening–Severn Beach, Feb., Mar., and 250, May. Large numbers, August, though fewer than in 1969: up to 550, New Grounds; 700, Chittening–Severn Beach; 400 Littleton; 200, St. George's Wharf and 300, Sand Bay. Reservoirs: 1, Chew Valley, May 4 (RMC); 40 records, July 26–Nov. 7, with up to 34, Blagdon; 60, Chew Valley and 15, Cheddar, Aug.–September.

LITTLE RINGED PLOVER *Charadrius dubius*

Single birds, New Grounds, Apr. 13–May 9 (PLG, GS *et al.*), and

Cheddar res., Apr. 12 (SBE). Nineteen reports, New Grounds and Blagdon, Cheddar and Chew Valley resrs., July 25–Sept. 4, of one or two birds, adult and immature.

KENTISH PLOVER *Charadrius alexandrinus*
G. One, New Grounds, Mar. 27 (TDE). Third record for Bristol district (others, Severn Beach, 1947 and New Grounds, 1960).

GREY PLOVER *Charadrius squatarola*
G. Records (19), coastal localities, Jan.–May 26, with max., 13, New Grounds, May 12 (LPA); several May birds in summer plumage; 26 records, Sept. 16–Nov. 30, with max. 26, New Grounds, Oct. 12 (LPA) but *c.*100, Chittening, seen at close range at dusk, Sept. 27 (NTL).
S. One, Sand Bay, Apr. 19 and June 6 (RA); up to three, coast, Sept. 27–Dec., with six, St. George's Wharf, former date. One, Chew Valley res., Oct. 31 (SBE)–only resr. record.

GOLDEN PLOVER *Charadrius apricarius*
G. Only records over five birds: 50, New Grounds, Feb. 14; 63 over same place, Mar. 15, and 30 there, Sept. 29 (LPA, TDE).
S. 34 records, Jan.–Apr. 20 and Sept. 27–Dec.; also one heard, Clevedon coast, June 30 (JFB).

TURNSTONE *Arenaria interpres*
G. Chittening–Severn Beach: up to 200, Jan.–June 7 and July 28–Dec., but up to 350, early October. Oldbury area: 30–50, Sept.–Oct. Elsewhere on coast, **G**. and **S**., up to ten present, all months, but 20–30, St. George's Wharf, Feb. and July. Chew Valley res.: one, July 26 and eight, Aug. 22.

COMMON SNIPE *Gallinago gallinago*
Noted, coast, moors and resrs., Jan.–Apr. 19 and Aug. 2–Dec.; 78 reports (four from **G**.), with up to 40, St. George's Wharf, and in autumn up to 50, Cheddar res. and Weston Airport; 150, Clevedon, Nov. 30, and 60, Axe Estuary, December. Drumming heard, Chew Valley res., June; numbers there rose to 150 by late October.

JACK SNIPE *Lymnocryptes minimus*
G. One, Fishponds, Bristol, Jan. 17—flew to Alcove Lido (BLK).
S. Nineteen records, Jan.–Apr. 2 and Sept. 12–Dec., mostly of single birds, coast, Mendip and resrs., but up to three, Weston-s-Mare Airport, Mar. and Dec., and Chew Valley res., Oct., and two flushed, Mendip, November.

WOODCOCK *Scolopax rusticola*
Thirteen records of one or two, scattered localities, Jan.–Mar. and

Oct. 27–Dec., including one found dead in Dursley town and one killed striking window, BBC, Bristol, Nov. 30.

CURLEW *Numenius arquata*
Present all months. Peak counts—New Grounds: 455, Jan.; 306, July; 250–300, Oct.–Dec. (LPA); Chittening: 150–180, Feb., Aug., Nov. (NTL); Portbury Wharf: 150, Feb. (JFB); Sand Bay: 135, July, Dec. (RA, TB). Max. resr. count: 6, Chew Valley, Nov. 22 (RMC.).

WHIMBREL *Numenius phaeopus*
Noted, Apr. 17–June 13 (43 reports, 20 in **G.**—mainly at New Grounds), with max. 25, Cheddar res., May 15; and July 12–Sept. 9 (17 reports, 9 in **G.**) with max., 8, Kingston Seymour, Aug. 12. One, Sand Bay, on late date of Nov. 1 (TB).

BLACK-TAILED GODWIT *Limosa limosa*
Coast: six reports (four in **G.**), Jan.–Apr. 19, and 29 (12 in **S.**), July 12–Dec., mostly of up to ten birds, but 120, Chittening, Jan. 31 (RGT) and up to 60, Axe Estuary, Oct. 3–Nov. 6 (RA *et al.*). Up to five, Chew Valley res., Aug.–early Sept.

BAR-TAILED GODWIT *Limosa lapponica*
Coast: 11 reports (10 in **G.**), Jan.–May 18, and 49 (29 in **G.**), Aug. 3–Dec., mostly of under 20 birds, but with up to 40, autumn, New Grounds, Oldbury, Littleton, Sand Bay and Weston Bay; 130, Uphill, Oct. 20 (WGB). Single birds, Cheddar res., Sept. 11 and Nov. 7 (BR).

GREEN SANDPIPER *Tringa ochropus*
Eight records (four in **G.**) Jan.–May 4, and 100 (14 in **G.** and 60 from resrs.), June 27–Nov. 26, mostly of one or two birds; but in autumn up to four, St. George's Wharf and resrs., with up to 13, Chew Valley, Aug. 6–Sept. 6.

WOOD SANDPIPER *Tringa glareola*
S. Single birds, Chew Valley Lake, June 1 (RA), July 29–Aug. 22, Sept. 10–21 and Oct. 13 (GLB, PJC, RMC *et al.*). Two, Axe Estuary, Aug. 11 (DJP); one, Sand Bay, Aug. 23, Sept. 4 (RA, TB).

COMMON SANDPIPER *Tringa hypoleuca*
Coast: 47 reports (26 in **G.**) of up to eight, Mar. 21–Dec. 31, mostly from New Grounds and St. George's Wharf. Reservoirs: 62 reports, Mar. 30–Nov. 10, with max., 11, Barrow Gurney and 26, Cheddar, April; and 10, Blagdon, 25, Cheddar and 30, Chew Valley, August.

REDSHANK *Tringa totanus*
Present all months. Up to 200, Chittening and 60, Sand and

Weston Bays, Jan.–Mar. Autumn peaks: 300–400, Chittening to Severn Beach, Aug.–Sept., and 200, Dec. (NTL); 100–120, Sand and Weston Bays, Oct. (RA). One or two, Chew Valley res., spring and autumn. Bred, coast, Clevedon-Yeo Estuary. 96 records (66 in **G.**).

SPOTTED REDSHANK *Tringa erythropus*

G. New Grounds (55 records): up to three, Apr. 11–May 19; up to 11, June 20 to end July, then up to 22 to Nov. 16.

S. Up to three, Aug. 11–Oct. 6; 30 records (26 from resrs.).

LESSER YELLOWLEGS *Tringa flavipes*

G. One, New Grounds, Apr. 2–27 (TDE, SPH, KJ, CMS *et al.*). Record, first for County of this N. American species, accepted by *Brit. Birds* Rarities Committee.

GREENSHANK *Tringa nebularia*

Single birds, New Grounds, Mar. 22, Apr. 11 (LPA, JDS) and Cheddar res., Apr. 5 (PJC, HWN). Autumn: 99 reports (25 in **G.**, 62 from resrs.) of up to four, July 20–Dec. 27; but up to 12, New Grounds, and 14, Chew Valley res., August–September.

KNOT *Calidris canutus*

Noted, Jan.–June 12 and Aug. 2–Dec.; 40 records (20 in **G.**). Up to 600, Sand and Weston Bays, Jan., and up to 350, Dec.; only other count over 12 was 150, Sand Bay, March 8.

PURPLE SANDPIPER *Calidris maritima*

G. Up to four, Chittening–Severn Beach, Jan. 11–Apr. 30 and Nov. 1–Dec. 19, but six, Apr. 9–18 and seven, Dec. 19 (NTL).

S. Two, St. George's Wharf, Feb. 22 (WGB) and Brean Down, Nov. 15 (PJC). Single birds, Brean Down, Apr. 15 (GBB) and Sand Point, Nov. 15 (RA).

LITTLE STINT *Calidris minuta*

Single birds, New Grounds, Jan. 20 (TDE) and May 11–19, and Severn Beach, May 16. Reports (55) of one or two, New Grounds, Oldbury, Chittening, Sand Bay and resrs., July 21–Dec. 20, but up to six, Chew Valley, Aug., and up to eight, New Grounds, Oct., with *c.*20 there, Oct. 3 and 4th.

TEMMINCK'S STINT *Calidris temminckii*

S. One, Cheddar res., Aug. 28–Sept. 1 (BR, PJC, RMC, PLG *et al.*); the first record for the district or County since 1964.

PECTORAL SANDPIPER *Calidris melanotos*

S. One, Chew Valley res., Sept. 8–13 (RA, GLB, PLG), was the eleventh County record (first, Barrow Gurney, 1935).

Dunlin *Calidris alpina*

Coastal records (158, with 120 in **G.**), all months. Max. counts: **G.**—3,500, Chittening-Severn Beach, Jan., Feb. and Dec.; 2,000 March and Nov.; and 1,000, May and Oct.; 1,000, New Grounds, Jan. and Oct., and Littleton area, November; **S.**—3,000, Weston Bay, Jan.; 4,000–4,500, Sand Bay, Nov.; 2,500, Weston Bay, Dec. Reservoirs: 92 records, all months, with max. 70–100, Chew Valley, Jan. and Nov., and 70–130, Cheddar, Oct.– Nov.

Curlew Sandpiper *Calidris testacea* *See pp.* 23, 24.

One, New Grounds, May 19 (LPA); 44 reports, Aug. 21–Nov. 7, of up to four, New Grounds, Chittening, St. George's Wharf, Sand Bay, Axe Estuary and resrs., with six, Axe Estuary and Chew Valley res., Aug., and 15, Chittening, Oct. 4 (NTL).

Sanderling *Crocethia alba*

G. Reports (28), Apr. 16–June 4 and July 21–Oct. 18, from Severn Beach (up to seven) and New Grounds, where up to 11, but 64, May 19 (TDE) and 30–45, May 24–June 2 (LPA, KJ).

S. Up to five, Weston Bay area, Jan., Mar., Sept.–Dec.; 17, Sand Bay, May 22 (RA); four, Cheddar res., May 30 (SBE).

Buff-breasted Sandpiper *Tryngites subruficollis* *See p.* 24.

S. One, Cheddar res., Oct. 17 and 18 (BR, RMC *et al.*). Record, second for district, accepted by *Brit. Birds* Rarities Committee.

Ruff *Philomachus pugnax*

Reports (90, 45 in **G.**), coast and resrs., all months but March, of up to six birds, but up to ten, Chew Valley res., late Aug. and early Sept., and up to 26, New Grounds, December.

Avocet *Recurvirostra avosetta*

S. Single birds, Sand Bay, Aug. 5 (TB) and Cheddar res., Oct. 22–26 (PJC, JAMCG, BR *et al.*).

Arctic Skua *Stercorarius parasiticus*

S. Single birds off Brean Down, Apr. 19, May 17, June 4, Aug. 31 and three, May 15 (BR). One, Sand Bay, Sept. 14 (RA).

Great Skua *Stercorarius skua*

S. One, Sand Point, Feb. 3, Nov. 3 (TB). One, Brean Down, June 12; nine, Aug. 16 and one, Sept. 6 (BR).

Pomarine Skua *Stercorarius pomarinus*

G. Three over river, Frampton on Severn, May 12 (DAC, JG).

Lesser Black-backed Gull *Larus fuscus*

S. Migrant flock of 500, Failand, Apr. 15 (JFB). Total of 145, Emborough, Oct. 5 (BR), evidently from Chew Valley res. roost, where over 700 noted, Sept. 10 (PJC). One, Scandinavian race, Chew Valley res., Feb. 8 (BR).

Herring Gull *Larus argentatus*

S. Large counts from Cheddar res. include *c.*1,000, Mar. 27 and 1,270, Dec. 27, which undoubtedly reflect the presence of nearby rubbish dump (PJC). One carrying live snake (probably Grass Snake) in its bill, Tickenham Moor, June 3 (JFB).

Common Gull *Larus canus*

G. Frampton on Severn roost estimated at 20,000–25,000 on late date of Apr. 3 (TDE). Migrant party of 180, New Grounds, May 17 (LPA).
S. Only counts of note were 250 near E. Horrington, Jan. 11 (BR) and *c.*50, Winscombe, daily throughout winter (WLR).

Mediterranean × Black-headed Gull *L. melanocephalus × ridibundus*

G. One second-winter bird with flock of Black-headed Gulls, Chittening, Sept. 6 (PJC, CEDS) had all the features of *L. melancephalus* except that leading edges of wings were white.

Little Gull *Larus minutus*

G. One, New Grounds, Apr. 23 (LPA). Two, Frampton Pools, May 3–17 but six on 16th; one, May 24, 31 (TDE, SPH).
S. Winter record of one, Sand Bay, Feb. 9 and 10th (TB *et al.*). One, Cheddar res., Apr. 7 (HRHL). Chew Valley res.: up to six, May 13–23, then one to June 13 (GLB, SPE *et al.*); juv., Aug. 7–23, three on 25th, four juvs. on 31st and one, Sept. 6–24 but five on 13th; two ads., one imm., Oct. 17 (PJC, PLG, NTL *et al.*). Single juvs., Sand Point, Aug. 16; Cheddar res., 16th–18th; and Blagdon res., Sept. 13 (HRHL, BR *et al.*).

Sabine's Gull *Larus sabini*

S. Adult, Chew Valley res., Sept. 6 (RH). First record for 13 years, and eighth for Bristol area. Details supplied mention: white head with dark mark behind eye; very conspicuous black, white and grey triangular wing patterning; and forked tail.

Kittiwake *Rissa tridactyla*

Recent observations, especially sea-watches by BR, indicate species now regular in Estuary during April–June:

Seen off	Apr. 28	May 11	15	17	26	29	June 4	7
Brean ..	40		52	70	14	7	12	
Portishead ..								20
New Grounds		5						

Other records: single birds, Cheddar, Jan. 9; Portishead, Feb. 8; Frampton, Apr. 22 and May 9; Chew Valley, May 28; and off Brean, July 15–25, with four, Aug. 16; up to four, Sand Bay, Feb. 4–Mar. 4 and July 2.

BLACK TERN *Chlidonias niger*

Noted on 60 days, Apr. 17–Nov. 1. Small numbers, early May with influxes May 15, 16 and early June (11, Cheddar res. and 46 off Brean, June 5). Main counts on return passage:

	Aug.								Sept.			
	2	6	7	13	14	16	17	22	4	10	12	13
Frampton		18		6		18		6	6	6	2	
Cheddar R.		4		6		27	29	19	5	25		10
Chew V.R.	*c.* 85		25	9	15	2	2	19	15	5	50	11
Blagdon R.												4

WHITE-WINGED BLACK TERN *Chlidonias leucopterus*

S. Juvenile with Black Terns, Chew Valley res., Aug. 13–16 (RMC, PLG *et al.*) and another, Sept. 12–16 (PJC, PLG, MAW), the 8th and 9th for the area. Records accepted by *Brit. Birds* Rarities Committee.

COMMON TERN *Sterna hirundo.* ARCTIC TERN *Sterna macrura*

Noted every month April–Oct.; no real break between spring and autumn passages. Substantial movements, May, June and Sept.:

	May				June		September		
	9	10	11	15*	4	5*	10	12*	13
Frampton	30	175	53					1	
Cheddar R.				9			10		12
Chew V.R.				12			41	30	15
off Brean				100	47	83	1		
Sand Bay									2

* see also Black Tern.

LITTLE TERN *Sterna albifrons*

Spring records: 11, New Grounds, May 4 (LPA); four, Clevedon (RGT), and three, Frampton (TDE), May 5; one, Frampton, May 12 (LPA) and 12, Frampton Pools, on 16th (TDE); three, Chew Valley res., May 26. Autumn records: one, Chew Valley res., Sept. 13 (PJC) and six on 14th (DW); one, Sand Bay, Oct. 4 (RA).

SANDWICH TERN *Sterna sandvicensis*

G. Two, New Grounds, May 11 (LPA).

S. Noted off Sand Point: one, Apr. 23; two, June 25, Aug. 2 (RA, TB); also off Brean Down–three, June 21; one, July 16, Aug. 22, 27 and two, Aug. 12, 16 and Sept. 13 (RA, BR).

RAZORBILL *Alca torda*

S. Two off Brean Down, Apr. 19; three, May 15 and two, 28th (BR).

LITTLE AUK *Plautus alle*

G. Ad. ♀ found, 'S. Glos.' Nov. 12, taken to WT, where died.

GUILLEMOT *Uria aalge*

G. One close offshore, Frampton on Severn, Apr. 22 (GBB) and one, same place, Sept. 20 (SPH). Imm. ♂ found, Severn Beach, Oct. 6, died following night (JDRV).

STOCK DOVE *Columba oenas*

Nests found, Thornbury, Olveston, Cowhill, and Wickham Glen and Vassall Park, Bristol. Several winter flocks of 30–40; over 100, King Down Farm, Cheddar, Dec. 20 (BJG).

TURTLE DOVE *Streptopelia turtur*

Eleven records (cf. 24 in 1969 and 44 in 1968), May 7–Aug. 21. Flock of *c.*14, Frampton Pools, Aug. 1 (TDE).

COLLARED DOVE *Streptopelia decaocto*

Reported widely, all year—clearly continues to spread, but data not adequate for complete picture.

BARN OWL *Tyto alba*

G. 1969: one, Lower Almondsbury, reported present for a month (NJC); report of one shot, Shirehampton, April (KBY). 1970: one, Yate, Jan. 1st (*per* CG) and one, Nailsworth, Dec. 28 (JMLP).

S. 1969: Single birds, Hunstrete, Jan. 5 (RJL); Chew Valley res., Feb. 3, 11, Nov. 17, 21 (DW); Nailsea, Feb. 5 (HRH); Lympsham, Feb. 13 (RJL); Easton, Feb. 16 (FB) and Sutton Wick, Sept. 29 (DW). Two, Cheddar, April 14 (TBS). 1970: Single birds, Chew Valley res., Feb. 7, May 12, 13, Aug. 14 (PJC, DW); Middle Hope, Feb. 24 (TB); nr. Hunstrete, Mar. 9 (DW); Lympsham, Apr. 16 (TB); Hunter's Lodge, Mendip, Nov. 26 (GAF) and Nailsea Moor, Dec. 24 (AMW, GW).

LITTLE OWL *Athene noctua*

G. 1969: reported from Tockington, where two pairs bred (AEB), Cromhall, Frampton on Severn and Tetbury. No. 1970 data received.

S. 1969: Bred, Chew Valley res., Litton, Bishop Sutton, nr. Banwell, Nailsea and Norton Malreward. Breeding season reports from 21 other localities. One found dead, Whitchurch, July 20 (PJC) and one, disturbed by fireworks, Bristol City Football Ground, Oct. 2 (DJP). 1970: One, Ashton Gate, Bristol, various dates, May (SBE, CG). Pair reared two young, Nailsea (HRH). Widespread reports throughout the year.

SHORT-EARED OWL *Asio flammeus*

G. 1969: one, Frampton on Severn, Oct. 17 and various dates,

Nov. (GA, LPA, RKB *et al.*). 1970: one, Frampton on Severn, Apr. 11 (RKB, TDE) and up to three, various dates Nov., and Dec. 14 (LPA, BJM, JMLP); one, Chittening, Oct. 11, 22 (NTL); one, Rodborough nr. Stroud, Oct. 31 (KJ).
S. 1969: one, Sand Bay, Dec. 13 (RA), 1970: one, nr. Wells, Mar. 27 (WJHH); one, Sand Bay, Nov. 11 (TB); up to three, Kingston Seymour, end Nov.–early Dec. (RMC, BR).

Alpine Swift *Apus melba*
G. One in flight, Stroud, Apr. 16 (KJG). Record, accepted by *Brit. Birds* Rarities Committee, is first for County apart from two old unauthenticated records.

Lesser Spotted Woodpecker *Dendrocopos minor*
Records from: **G.**—Frampton on Severn, Frocester, Berkeley, Tockington, Frampton Cotterell, and in Bristol, Eastville Park (breeding behaviour), Wickham Glen, Vassall Park and Oldbury Court; and **S.**—Easton in Gordano, Leigh Woods, Ashton Park, Blagdon res., Wells, Newton St. Loe and Rainbow Wood (Bath).

Wryneck *Jynx torquilla*
S. One in garden, Congresbury, Sept. 23 (RBT).

Woodlark *Lullula arborea*
S. Two, Sand Bay, Dec. 27 (RA).

Shore Lark *Eremophila alpestris*
S. One, Cheddar res., Nov. 10, 1969–Apr. 22 (PJC, HRHL *et al.*).

Red-rumped Swallow *Hirundo daurica*
S. One, St. George's Wharf, June 7 (WGB). Record, first for County or district, accepted by *Brit. Birds* Rarities Committee.

Sand Martin *Riparia riparia*
Breeding records from: **G.**—Bristol (Eastville and St. Werburgh's) and **S.**—Midford and Frome (RMC, RH, BLK, BR).

Raven *Corvus corax*
S. Two pairs, Brean Down area, Jan.–May. One pair bred successfully. Two, Kingston Seymour, Nov. 28. Single birds, Priddy, Apr. 27 and Compton Bishop, Sept. 27.

Hooded Crow *Corvus cornix*
S. One, St. George's Wharf, Dec. 14, 1969–Mar. 3 (WGB).

Willow Tit. *Parus atricapillus*
S. Single birds; E. Horrington, Jan. 11 and Litton res., 20th (BR); Walton Moor, July 20 (JFB). Two, Priddy Pools, Nov. 22 (JAMCG).

Bearded Tit. *Panurus biarmicus*
S. One, Chew Valley res., Nov. 8 (AJP).

Dipper *Cinclus cinclus*
G. Present, Snuff Mills, Bristol, Mar.–Aug.; nests built, but no proof of successful breeding (BLK).
S. Two, Shockerwick, Jan. 4. Single birds, Rode, July 21 and 26, and Midford, Nov. 15 (RMC).

Ring Ouzel *Turdus torquatus*
Ten, Crook Peak, Mar. 30, and 25, Apr. 9th; up to six, Brean Down area, Apr. 15; single birds, Stoke Park, Bristol, Apr. 2 and Purdown, Apr. 7, Worle, Apr. 18 and Sand Point on 26th.

Wheatear *Oenanthe oenanthe*
Fifty-four reports (35 from **G.**) of up to 7, from widespread localities, Mar. 18–May 6 and July 7–Oct. 25.

Stonechat *Saxicola torquata*
Reports (44) of up to four from widespread **G.** and **S.** localities. **S.** Breeding proved at Sand Point, Wavering Down, Compton Bishop and old airport, Whitchurch.

Whinchat *Saxicola rubetra*
Reports of up to three from: **G.**—Frampton on Severn (where bred successfully), Filton and Chittening; and **S.**—St. George's Wharf, Sand Bay, Weston-s-Mare, Nailsea Moor, Backwell and Cheddar and Chew Valley resrs., Apr. 18–Oct. 31.

Redstart *Phoenicurus phoenicurus*
One, sometimes two, reported from: **G.**—Ingst, Littleton on Severn and Filton; and **S.**—Nailsea, Sand Point, Cheddar Gorge, Chew Valley res., Chewton Mendip, Clutton and Midford – Combe Hay, Mar. 29–Sept. 6.

Black Redstart *Phoenicurus ochrurus*
G. Adult male, Frampton Pools, Dec. 30 (NJR).
S. Single birds, Brean Down, Kingston Seymour and Cheddar res., Mar. 30–Apr. 8 and Oct. 17–Dec. 20 (GBB, RMC, BR).

Nightingale *Luscinia megarhyncha*
Singing ♂♂ reported from: **G.**—Frampton on Severn, Tortworth, Cromhall, Ingleston Common, Winterbourne Down, Henbury and Clifton Down, Bristol; and **S.**—Leigh Woods, Abbots Leigh, Sand Point and Batheaston, Apr. 19–June 14.

Grasshopper Warbler *Locustella naevia*
Singing ♂♂ reported from: **G.**—Frampton on Severn, Damery, Tortworth, Cromhall, New Passage, Chittening, Filton, and

Stapleton and Clifton Down, Bristol; and **S.**—Leigh Woods, Ashton Hill Plantation, St. George's Wharf, Weston in Gordano, Clevedon, Kingston Seymour, Sand Bay, Sand Point, Brean Down, Wavering Down, Blackdown, Chew Valley res., Hunstrete, Pensford, Newton St. Loe and Bathford.

BLACKCAP *Sylvia atricapilla*
Wintering pairs reported from Westbury on Trym and Sneyd Park, Bristol; several other individuals ringed, latter place and Abbot's Leigh, late Nov. and December (HRHL, TBS, GAW).

WOOD WARBLER *Phylloscopus sibilatrix*
Reports of up to seven from: **G.**—Clifton Down, Bristol; and **S.**—Leigh Woods, Abbot's Pool, Ashton Park, Ashton Hill Plantation, Clevedon; Brockley, Goblin and Burrington Combes; Cleeve, Weston Woods, W. Horrington, Emborough and Rainbow Wood, Bath, May 3–Aug. 23.

FIRECREST *Regulus ignicapillus*
G. Single birds, Frampton on Severn, Mar. 3 and 24th (LPA, LTCS).
S. One, Chew Valley res., Nov. 8 (AJP).

PIED FLYCATCHER *Muscicapa hypoleuca*
S. One, Brean Down, Aug. 27 (BR).

TREE PIPIT *Anthus trivialis*
Breeding proved, Priddy. Up to four, Frampton on Severn, St. George's Wharf, Leigh Woods, Backwell Hill, Goblin Combe, Wrington Warren, Brean Down and W. Horrington, Apr. 15–Aug. 30.

ROCK PIPIT *Anthus spinoletta petrosus*
S. Inland records of single birds, Cheddar res., Mar. 30, Oct. 24 and 25th, and Nov. 29 (PJC, JAMCG, BR).

WATER PIPIT *Anthus spinoletta spinoletta*
S. Reports (44) of up to four, Cheddar and Chew Valley resrs., Jan. 9–Apr. 5 and Nov. 8–Dec. 28.

WHITE WAGTAIL *Motacilla alba alba*
One or two reported, New Grounds, Wick, Sand Bay, Uphill and Cheddar and Chew Valley resrs., Apr. and Sept., but at least six, Cheddar res., Apr. 28 (BR).

BLUE-HEADED WAGTAIL *Motacilla flava flava*
S. Male, Cheddar res., Aug. 6, showed characters of this form (JAMCG).

WAXWING *Bombycilla garrulus*

G. Up to three, Uley, Nov. 9 and 13th (RC), New Grounds, 15th and 20th (WT) and Frampton Cotterell, 17th (JEC). One, Clifton Down, Bristol, Dec. 31 (PLG).

S. Two, Cleeve, Dec. 4 (VG); one, Southville, Bristol, 31st (PLG).

GREAT GREY SHRIKE *Lanius excubitor*

S. Single birds, Brean Down, Oct. 18 (BR) and Rookham, Dec. 10 to end year and into 1971 (JAMCG *et al.*); two different birds seen, latter place, in quick succession, Dec. 13 (JAMCG).

HAWFINCH *Coccothraustes coccothraustes*

G. Up to four, Clifton and Durdham Downs, Bristol, Feb. 22–May 31 (RH, HRHL, NTL, TBS).

S. Breeding proved, Rainbow Wood, Bath (RMC). Single birds, Wraxall, Jan.–Feb. (WG), Leigh Woods, Apr. 13 (GBB) and Failand, May 15 (JJ).

SISKIN *Carduelis spinus*

G. Up to 70, Frampton Pools, Jan. 4–Mar. 25; 20, same place, Nov. 29; six, R. Avon, Hanham, Dec. 27.

S. Twenty-four reports of up to 80, mainly from coast and reservoirs, Feb. 14–Apr. 19 and Oct. 4–Nov. 28.

REDPOLL *Carduelis flammea*

Reports (47) of up to 18 from nineteen coastal and inland localities, Jan. 4–May 19 and Sept. 20–Nov. 25.

BRAMBLING *Fringilla montifringilla*

Reports (20) of up to 60 from twelve localities, Jan. 3–Mar. 16 and Nov., but 200, Severn Beach, Feb. 15 (RGT) and 300, Sand Bay, Oct. 29 (TB).

CORN BUNTING *Emberiza calandra*

G. Count of 71 singing ♂♂ and a family party of eight, Acton Turville–Marshfield–Tormarton area, June (ADL *et al.*)—cf. 66 in 1969 and 77 in 1968. Two, Frampton on Severn, July 18.

S. Up to five, Clevedon, Yoxter (Mendip), Charterhouse, Queen Charlton and Lansdown, May 26–July 8.

CIRL BUNTING *Emberiza cirlus*

Four, Bleadon Hill, Mar. 30. Records of singing ♂♂ from Horseshoe Bend, R. Avon (Bristol), Winford, Cheddar, Cheddar res., and Compton Bishop, but fewer reports than usual.

SNOW BUNTING *Plectrophenax nivalis*

G. One, New Grounds, Nov. 14 (LPA); one, Frampton Pools, Nov. 22 (RKB).

S. Up to five, Portishead, Sand Bay and Cheddar res., Jan. 21–Mar. 5 and Dec. 9–31 (TB, BR, MAS).

TREE SPARROW *Passer montanus*

Reports (24) of up to 35 from fifteen localities.

OTHER COMMON OR REGULARLY OCCURRING SPECIES PRESENT

(those marked * are mentioned in the Foreword).

Residents: Little Grebe, Mallard, Mute Swan, Pheasant, Moorhen, Coot, Great Black-backed Gull, Black-headed Gull, Woodpigeon, Cuckoo, Tawny Owl, Kingfisher, Green Woodpecker, Great Spotted Woodpecker, Skylark, Carrion Crow, Rook, Jackdaw, Magpie, Jay; Great, Blue, Coal, Marsh and Long-tailed Tits; Nuthatch, Treecreeper, Wren, Mistle Thrush, Song Thrush, Blackbird, Robin, Goldcrest, Dunnock, Meadow Pipit, Pied and Grey Wagtails, Starling, Greenfinch, Goldfinch, Linnet, Bullfinch, Chaffinch, Yellowhammer, Reed Bunting, House Sparrow.

Summer or Winter visitors or passage migrants: Swift, Swallow,* House Martin*; Reed, Sedge and Garden Warblers; Whitethroat*, Lesser Whitethroat, Willow Warbler, Chiffchaff*, Spotted Flycatcher.

BOUNDARY OF THE BRISTOL DISTRICT

From Jan. 1, 1968 the boundaries of the area covered by this report were changed so as to facilitate consistent recording by providing readily recognisable boundaries. The District is now defined as follows:

that part of Glos. lying east of the Severn, bounded on the N. by the R. Frome from its mouth at Arlingham Bend inland to Dudbridge, then by its tributary S. to Avening, then by the A 434 road through Tetbury to the Wilts. border; and that part of Somerset bounded on the S. by the R. Axe from its mouth to Wookey, and then by the B 3139, A 371, A 361 and B 3098 roads through Wells, Shepton Mallet and Frome to the Wilts. border. Brean Down, Steep Holm and The Denny are deemed to lie within the area.

LEPIDOPTERA NOTES BRISTOL DISTRICT, 1970

BUTTERFLIES

By M. A. Silcocks

THIS is a much shorter report than previous years, due to lack of space. Many records have been received of the commoner species and all have been filed for future reference. It is hoped that at least as many will be received for 1971 when it is anticipated that a comprehensive report will again be published.

Contributors were: R. Angles (RA), T. Bomford (TB), J. M. Boyd (JMB), A. R. D. Brown (ARDB), J. F. Burton (JFB), R. M. Curber (RMC), B. J. Gregory (BJG), A. N. Grose (ANG), B. L. Kington (BLK), T. B. and M. A. Silcocks (T and MS), R. B. Tunstall (RBT), Miss D. Withers (DW).

G and **S** refer to West Gloucestershire and North Somerset respectively.

Eumenis semele L. (Grayling)
G. Bream: several, July 30 (ANG).
S. Reported from Brean Down, Sand Point, Dolebury Warren and Goblin Combe (RA, BLK, MS).

Maniola jurtina L. (Meadow Brown)
S. Crook Peak: 1, May 24, an early date (JFB).

Argynnis selene Schiff. (Small Pearl-bordered Fritillary)
G. Blackpool Bridge: several, June 3 (ANG).
S. Charterhouse: 10, June 20 (T and MS); Goblin Combe, 12, July 5 (ARDB).

Argynnis euphrosyne L. (Pearl-bordered Fritillary)
G. Forest of Dean: 8, May 26 (ARDB); 1 near Tintern, June 1 (ANG).

Argynnis aglaia L. (Dark Green Fritillary)
G. Midger Wood: 1, June 23; Stinchcombe: several, July 23; Kilkenny: 3, July 11 (ANG); Saddlewood Roughs: 1, August 8 (ARDB).
S. Brean Down: 1, June 21 and August 7 (RA); Goblin Combe: 12–15, July 5 and 17 (ARDB), 20, July 29 (T and MS); Sandford Hill: 4, July 30 (T and MS); Charterhouse: 2, August 7 (ARDB); Dolebury Warren: 2, August 14 (BLK).

Argynnis cydippe L. (High Brown Fritillary)
S. Goblin Combe: 2 males and 1 female, July 5 (ARDB).

Argynnis paphia L. (Silver Washed Fritillary)
G. Edge: 1, July 29; Saddlewood Roughs: 2 males and 1 female, August 8 (ARDB); Dymock Wood: several, July 6 and 13; Gorley: 3, July 7; Blackpool Bridge: 4, July 11 (ANG).
S. Clevedon: 1, August 2 (T and MS).

Euphydryas aurinia Rott. (Marsh Fritillary)
S. Charterhouse: common, June 4, 5, June 20 (T and MS).

Polygonia c-album L. (Comma)
Again recorded from many localities, the two latest were Clevedon: 1 in fresh condition, October 17 (JFB) and Congresbury: 1, November 12 (RBT).

Limenitis camilla L. (White Admiral)
G. Michael Wood: 12, July 4 (ARDB); Inglestone Common: 2, July 23 (ANG). Several sites in the Forest of Dean and near Newent, early July (ANG).

Hamearis lucina L. (Duke of Burgundy Fritillary)
Reports of single specimens have come from two localities in Gloucestershire, June 2 and 11 (ANG).

Cupido minimus Fuessl. (Small Blue)
G. Barnsley Warren: several, June 2 (ANG).

Callophrys rubi L. (Green Hairstreak)
S. Sandford Hill: 4, June 4 (T and MS), the only record received.

Thecla quercus L. (Purple Hairstreak)
G. Dymock Wood: 1, July 13; Blackpool Bridge: many, July 22 (ANG); Filton: 1, July 21 (RA).
S. Westhay Heath: 1, July 5 (JMB).

Strymonidia w-album Knoch. (White-Letter Hairstreak)
G. Kingsweston Hill: several, July 15; Humbleby Wood: 1, July 29 (ANG); Michael Wood: 1, July 4; Falfield: 1, July 7; Saddlewood Roughs: 1, August 8 (ARDB); Fishponds: 3, July 30 (BLK).

Leptidea sinapis L. (Wood White)
One record received from Gloucestershire, June 10 (ANG).

Colias croceus Fourc. (Clouded Yellow)
S. Sand Bay: 1, June 23 (TB).

MOTHS

By K. H. Poole

THE following list has been compiled from records received from C. S. H. Blathwayt (C.S.H.B.), A. D. R. Brown (A.D.R.B.), J. F. Burton (J.F.B.), K. H. Poole (K.H.P.) and T. B. Silcocks (T.B.S.).

Records of migrants were few, but included *Acherontia atropos*, *Macroglossum stellatarum* and *Leucania unipuncta*.

Acherontia atropos L. (Death's Head Hawkmoth), Bath, Sept. 14 (JFB).

Macroglossum stellatarum L. (Hummingbird Hawkmoth), Falfield, Glos., July 7* (ADRB).

Stauropus fagi L. (Lobster), Abbots Leigh, July 7 (TBS).

Polyploca ridens Fab. (Frosted Green), Milton, Weston-s-Mare, May 5 (KHP), Abbots Leigh, May 10 (TBS).

Dasychira pudibunda L. (Pale Tussock), Clevedon, June 3 (JFB).

Leucoma salicis L. (White Satin), Weston-s-Mare, June 20 (CSHB).

Trichiura crataegi L. (Pale Eggar), Shapwick, Sept. 5, common (CSHB).

Cycnia mendica Cl. (Muslin), Weston-s-Mare, Nov. 27, an unusual date (CSHB)

Eilema deplana Esp. (Buff Footman), Weston-s-Mare, Aug. 8 (CSHB).

Lithosia lurideola Zinck. (Common Footman), Clevedon, Aug. 5 (JFB).

Apatele alni L. (Alder), Weston-s-Mare, several, end of May and early June (CSHB), Milton, Weston-s-Mare, May 9 (KHP).

Apatele tridens Schiff. (Dark Dagger), Sand Bay, Kewstoke, larva on willow, Sept. 27* (TBS).

Anaplectoides prasina Schiff. (Green Arches), Abbots Leigh, June 11 (TBS).

Hadena thalassina Hufn. (Pale-shouldered Brocade), Clevedon, Aug. 5 (JFB).

H. bombycina Hufn. (*glauca* Hubn.) (Glaucous Shears), Weston-s-Mare, May 31 (CSHB).

H. conspersa Sch. (Marbled Coronet), Milton, Weston-s-Mare, July 6 (KHP).

Eremobia ochroleuca Esp. (Dusky Sallow), Nedge, Wootton-under-Edge, Aug. 8* (TBS), Weston-s-Mare, Aug. 3 (CSHB).

Antitype chi L. (Grey chi), Abbots Leigh, Aug. 28* (TBS)

Apamea unanimis Hubn. (Small Clouded Brindle), Shapwick, May 29 (CSHB).

A. scolopacina Esp. (Slender Brindle), Weston-s-Mare, Aug. 8 (CSHB).

Leucania unipuncta Haw. (White-Speck Wainscot), Weston-s-Mare, Sept. 29 (CSHB).

A. scolopacina Esp. (Slender Brindle), Weston-s-Mare, Aug. 8 (CSHB).

Leucania unipuncta Haw. (White-Speck Wainscot), Weston-s-Mare, Sept. 29 (CSHB).

Cerastis rubricosa Schiff. (Red Chestnut), Abbots Leigh, April 12 (2), April 15 (TBS).

Parastichtis suspecta Hb. (Suspected), Shapwick, July 23 (common) (CSHB).

Xanthorhoë ferrugata Cl. (Dark-barred Twin-spot Carpet), Clevedon, Aug. 5 (JFB).

Coenotephria derivata Schiff. (Streamer), Abbots Leigh, May 10 (TBS).

Pelurga comitata L. (Dark Spinach), Shapwick, July 23 (common) (CSHB).

Perizoma bifaciata Haw. (Barred Rivulet), Weston-s-Mare, Aug. 11 (CSHB).

Eupithecia indigata Hubn. (Ochreous Pug), Milton, Weston-s-Mare, June 9 (KHP).

E. venosata Fab. (Netted Pug), Abbots Leigh, June 4 (TBS).

Apeira syringaria L. (Lilac Beauty), Abbots Leigh, June 27 (TBS).

Ectropis extersaria Hb. (Brindled White Spot), Weston-s-Mare, early June (several) (CSHB).

Bupalus piniaria L. (Bordered White), Milton, Weston-s-Mare, June 9 (KHP).

Zygaena trifolii Esp. ssp. *decreta* (Five-spot Burnet), Walton Moor, Gordano Valley, July 20*, very numerous, varieties frequent, including one ab. *minoides* and two with dull orange spots and hindwings (JFB).

Unless marked * all were noted at light, and in single specimens except where shown otherwise.

ODONATA (DRAGONFLIES)

THE following records, all from North Somerset, have been contributed by Mr. J. M. Boyd.

Agrion splendens Harris (Banded Agrion), Stoke Moor, May 17 (5), May 31 (numerous).

Lestes sponsa Hansemann (Green Lestes), Westhay Heath, July 5–Sept. 6 (small colony).

Pyrrhosoma nymphula Sulzer (Large Red Damselfly), from May 16, throughout the rhyne country.

Ischnura elegans Van der Linden (Common Ischnura), May 30 to Sept. 20, throughout the rhyne country and Blagdon.

Enallagma cyathigerum Charpentier (Common Blue Damselfly), Blagdon, July 11.

Coenagrion puella L. (Common Coenagrion), May 17 to July 26, throughout the rhyne country in swarms.

Brachytron pratense Müller (Hairy Dragonfly), May 30 to June 28. Stoke Moor, Westhay and Weston Moor.

Aeshna mixta Latr. (Scarce Aeshna), Sept. 20 to 17 Oct. Colonies at Dolemoor and Sedgemoor. Individuals at Kingston Seymour and Hewish. In 1969 was also seen at Hermotts Pool, Wick St. Lawrence and Blagdon, but these colonies were not visited in 1970.

A. cyanea Müller (Southern Aeshna), Westhay Heath, June 14 (2, immature).

A. grandis L. (Brown Aeshna), Dolemoor, Congresbury, Sept. 27.

Sympetrum sanguineum Müller (Ruddy Sympetrum), July 11, Bladgon Lake (25–40).

Sympetrum striolatum Charpentier (Common Sympetrum), June 14 to Oct. 17. Common throughout the rhyne country.

Libellula quadrimaculata L. (Four-spotted Libellula), May 30 to July 5, Weston Moor, Sedgemoor, and Westhay, sometimes in large numbers.

L. drepessa L. (Broad-bodied Libellula), June 7 to 28. Catcott grounds and Westhay Heath, in fair numbers.

MAMMAL SURVEY BRISTOL DISTRICT, 1970

By Roger G. Symes

THE Mammal Section extended its area under survey to cover all those parts of Gloucestershire and Somerset within the northern half of the 100km. square ST, corresponding roughly in the north to a line from Berkeley to Cirencester, and in the south to one from Burnham-on-Sea to Frome. Although 299 records of observations were received for 1970 this was the lowest total for five years. It was however most encouraging that the number of species recorded was 30, the highest yet. This, with one exception, is not thought to be due to new species entering the district but rather to the fact that more members are becoming interested enough to submit specific records for the species they observe. Previously two or three individuals had been responsible for a large proportion of all records received. The confirmation of the presence in the Bristol area of the introduced Chinese Muntjac deer is most exciting and should lead to many more observations.

Thanks for records are due to Mrs. Anstee, Mrs. B. Bickerton (BB), J. M. Boyd, F. J. Bryant, *Bristol Evening Post* (BEP), Bristol Young Naturalists, J. F. Burton (JFB), R. L. Clarke, G. E. Clothier, M. Collins (MC), R. M. Curber (RMC), Dr. A. F. Devonshire, Miss C. Graham, Miss I. F. Gravestock, R. G. Hamilton (RGH), H. R. Hammacott (HRH), W. Harrison (WH), N. P. Humphris, Mr. and Mrs. H. G. Hockey, Miss L. E. Hurrell (LEH), J. M. Jarrett, A. F. Jayne, Mrs. R. E. Knight (REK), Mary (MK) and Martin Krajenski, Miss E. J. Lenton (EJL), Miss S. Lewis, Mrs. I. M. McKeag (IMMC), Ministry of Agriculture, Fisheries and Food (MAFF), A. D. Oldham (ADO), E. W. Powell (EWP), R. D. Ransome (RDR), F. H. Rawlings (FHR), J. G. Riley (JGR), Dr. R. J. G. Savage, M. J. Scott, E. S. Smith, M. Smith (MS), Mrs. V. C. B. Trewman (VCBT), G. A. Turrell (GAT), R. G. Williams, Miss D. Withers (DW), M. Zobel.

Check list numbers and names are taken from Corbet (1964).

1. HEDGEHOG. *Erinaceus europaeus*. The few records received were valuable. A pair was seen mating on 26 May at 23.45 BST (HRH) and a photograph of a litter of 5 newly-born young was published on 24 June (BEP). Earliest activity noted was on 2 (EWP) and 6 February (FHR), on the latter occasion the air temperature was about 0° C. Latest records, probably of juveniles of late litters which would not survive the winter, were on 1 (RMC) and 18 December (RGS).

2. MOLE. *Talpa europaea*. Records from Somerset included 4 found dead. There were only 2 records from within the City of Bristol and work on establishing the inner limits of the mole's range continues.

3. COMMON SHREW. *Sorex araneus.* Skulls found in bottles and owl pellets were the major source of records. Bottles found in one area of Poor's Allotment contained 45 skulls of this species alone. Ways are being sought of keeping trapped shrews alive overnight.

4. PYGMY SHREW. *Sorex minutus.* Trapped on field meetings at Midford (RMC) and Long Wood Wildlife Reserve (RGS). Both specimens had died in flap traps.

5. WATER SHREW. *Neomys fodiens.* Two skulls found in bottles at Poor's Allotment (RGS) were the only records, and the first for that locality.

8. GREATER HORSESHOE BAT. *Rhinolophus ferrumequinum.* Thanks mainly to M. Collins who is ringing this species on the Mendips a good batch of new records was received. Sightings mostly in caves were made at Banwell, Loxton, Burrington Combe, Cheddar, Wookey Hole, Clevedon, Winford, Dundry, Easton-in-Gordano, Coombe Down, Avon Gorge (MC) and Wraxall where a male found dead (RGH) had been ringed on 14 December 1963 at Cheddar and had since been recaptured four times on the Mendips (ADO).

9. LESSER HORSESHOE BAT. *Rhinolophus hipposideros.* Recorded from Hutton, Compton Bishop, Banwell, Axbridge, Burrington Combe, Cheddar, Draycott, Priddy, Ubley, Winford, Dundry, Easton-in-Gordano, Stoke St. Michael, Limpley Stoke (MC) and Ebbor Gorge (RMC).

11. WHISKERED BAT. *Myotis mystacinus.* Recorded from a Somerset Cave (RDR, MC).

12. NATTERER'S BAT. *Myotis nattereri.* Found with the whiskered bats (RDR, MC).

21. COMMON LONG-EARED BAT. *Plecotus auritus.* One discovered amongst greater horseshoe bats in another Somerset cave (RDR, MC) was our first confirmed record.

24. FOX. *Vulpes vulpes.* Mr. Rawlings, Fox Recorder, reports that whilst records of sightings within the City of Bristol over the past few years have indicated the possible locations of earths, actual sites are now being reported. Food is put out and taken regularly in four places and one interesting report detailed dates and times when foxes in one locality were heard calling. Two records of cubs were received, more with specific dates would be welcomed. A fox living in Eastville Stadium disrupted greyhound racing several times (BEP) and one at Kenn was shot whilst up a tree (JFB).

27. STOAT. *Mustela erminea.* After several lean years there was a most welcome increase in the number of records of this, and the next, species. All records of stoats were from Somerset. Two were seen fighting in Ashton Park on 21 September (JFB).

28. WEASEL. *Mustela nivalis.* Recorded in Somerset at Chew Valley, Nailsea (HRH), Long Wood (MS), Priddy (MC), Easton-in-Gordano (WH) and Failand (VCBT). Gloucestershire records were at Spaniorum Hill (EJL) and Falfield (REK).

30. AMERICAN MINK. *Mustela vison.* Reported in Somerset from Rivers Parrett, Little, Banwell, Yeo (MAFF), and Axe (GEC). Only recorded on the Leadon in Gloucestershire.

31. BADGER. *Meles meles.* Valuable information on locations of setts is gradually accumulating but there have been very few records of cubs. Eight badgers were reported killed on roads, six in Somerset, two in Gloucestershire. It is disturbing to reflect that the number of corpses reported must represent a small percentage of actual casualties.

32. OTTER. *Lutra lutra.* Several people mistakenly reported mink as otters but positive evidence of possibly more than one animal was found on one river (LEH), the location of which is not being published.

42. RED DEER. *Cervus elaphus.* Sightings of 6, almost certainly escaped from captivity, were reported from Berkeley (GAT).

45. ROE-DEER. *Capreolus capreolus.* Slots were recorded regularly at Stockhill Plantation.

47. CHINESE MUNTJAC. *Muntiacus reevesi.* Sighting reported from Cirencester area. This species appears to be spreading widely and a careful watch should be kept for it. It is even likely to establish itself in semi-urban areas.

53. BROWN HARE. *Lepus capensis.* Nearly all records from Somerset. Mr. J. M. Boyd reports that he and many others had the impression that hares were more numerous than in 1969.

55. RABBIT. *Oryctolagus cuniculus.* Records received from many areas in Gloucestershire and Somerset. Two records of young seen in May (REK, DW). Myxomatosis reported around Chew Valley Lake in the autumn (HRH).

57. GREY SQUIRREL. *Sciurus carolinensis.* Many reports of sightings of both live animals and dreys. Several people commented on the very reddish-brown colour of some individuals. One was reported to have held up traffic whilst it groomed itself on a main road (JGR), whilst another was seen to steal a banana from a fruit bowl inside an open window of a house (IMMC).

59. DORMOUSE. *Muscardinus avellanarius*. One was found inside a bird nest box at Hardington Moor, Yeovil (BB) in September.

62. WOOD MOUSE. *Apodemus sylvaticus*. Trapped on most field meetings; one was badly chilled due to the unfortunate use of damp bedding in traps. Majority of those caught have been males. One found in a nest box 7 ft. up a tree had evidently carried many leaves up to the box (HRH).

64. HOUSE MOUSE. *Mus musculus*. Several reports from premises in Bristol. Very few records have been received of house mice living away from buildings.

65. BLACK RAT. *Rattus rattus*. 3 reports from Bristol, 5 individuals poisoned in a warehouse at Old Market being *R.r.frugivorus*. Heavy infestation reported from factory at Yatton where they were thought to have been introduced in a freight container (RGS).

66. BROWN RAT. *Rattus norvegicus*. Most records from urban areas but one skull found in bottle at Poor's Allotment (RGS).

67. BANK VOLE. *Clethrionomys glareolus*. Trapped at several sites and a number of skulls found in bottles and pellets. One out of eleven skulls found at Poor's Allotment exhibited the "complex" condition of the upper third molar (Southern 1964).

68. WATER VOLE. *Arvicola terrestris*. Sightings on Rivers Avon (RGS) and Frome (MK) and Wellow Brook, Midford (EJL). Apparent absence in recent years reported from Nailsea Moor (HRH), this might be due to the depredations of mink.

69. FIELD VOLE. *Microtus agrestis*. Records from Nailsea (HRH), Poor's Allotment, Long Wood (RGS), Midford (RMC) and Spaniorum Hill (EJL).

No harvest mice or yellow-necked mice were found in 1970. Several members sent in records of sightings of unidentified bats. These are most useful in helping to establish the localities of roosts and all observations should be reported. Any bodies of dead bats should be preserved for confirmation of identification.

REFERENCES

Corbet, G. B. 1964. The Identification of British Mammals. British Museum (Nat. Hist.), London.

Southern, H. N. 1964. Handbook of British Mammals. Oxford: Blackwell.

A HERBARIUM BOOK OF DR. ARTHUR BROUGHTON

By A. J. Willis and D. Gledhill
(Departments of Botany, University of Sheffield
and University of Bristol)

DR. Arthur Broughton, described in William Barrett's *History and Antiquities of the City of Bristol* (1789) as an "ingenious physician and botanist", was Physician to the Royal Infirmary from 1780 to 1786 (White, 1912), and whilst in Bristol made a number of records of plants of the area, especially in the Avon Gorge. A catalogue of "rarer plants, etc., found about St. Vincent's Rock" by Dr. Broughton is given by Barrett (1789). White (1912, p.67) states that Dr. Broughton's collections, chiefly botanical, were bequeathed to the City of Bristol and housed in the King Street Library, but that "no one knows what has become of them" and that no trace could be found of them at King Street in 1893.

In October 1970 the existence of a herbarium book of 1779 by Dr. Broughton, held by Miss V. J. Macnair of Welshpool, Montgomeryshire, was drawn to the attention of one of us (A.J.W.) by Mrs. H. R. H. Vaughan, M.B.E. (Welsh Region B.S.B.I. secretary), who realized its possible interest and significance in respect of Bristol Botany. Miss Macnair, who was given the single volume by the late Miss M. H. Asterley, wished to find an appropriate repository for the book and, as the collections of White and other Bristol botanists are housed in the Department of Botany of the University of Bristol, it was thought appropriate to add the Broughton collection to this Herbarium. Miss Macnair kindly presented the book to the Herbarium of the University Department of Botany, and it was transferred there (by D.G.) in November 1970.

The large (19 × 12 in.) leather-bound book is much worn, and has 233 pages, many being blank and others bearing up to four plants, arranged and named according to the second Sexual System of Linnaeus. Unfortunately the only additional information is the common English names of each plant. The book appears subsequently to have been used as a plant press, and several specimens added (initialled J.H.O.) by the late J. H. Owen.

The title page is hand-written as follows: *Herbarium siccum complectens plantas quae per Insulas Britannicas sponte crescentes, inveniuntur secundum Systema sexuale distributas, et in Ordine Florae Anglicae dispositas. Tomus Primus. Collegit Arthurus Broughton M.D. Nosocomii Bristoliensis Medicus et Societatis regiae medicae Edinensis Socius 1779.*

The book originally contained 434 named specimens but four are missing and a few are damaged by mites. A fly-sheet lists 322 "plants which are deficient", from which it appears that Broughton intended the book to be a complete collection in the sense of Hudson's *Flora Anglica* (1778). This 'first book' includes plants from only the first fifteen of the classes of Linnaeus, and it seems probable that a second book comprised the remaining nine classes.

Of greatest value and significance in the book is a slip of paper bearing a manuscript list of species with their localities in the Avon Gorge and elsewhere in and around Bristol, but not all of these species which could be included in the first volume Herbarium book are represented. The full list is given below, in the order originally written, and where there has been a change of nomenclature, or in the names of localities, the modern names are included in parentheses after the entries.

Orchis pyramidalis *(Anacamptis pyramidalis)*	Brislington
Chlora perfoliata *(Blackstonia perfoliata)*	,,
Hedysarum onobrychis *(Onobrychis viciifolia)*	,,
Sedum dasyphyllum	Clifton
Cotyledon umb. veneris *(Umbilicus rupestris)*	Redland
Hypericum hirsutum	,,
Chenopodium serotinum *(C. ficifolium)*	,,
Mercurialis annua	,,
Gentiana centaurium fl. alba *(Centaurium erythraea)*	Wraxal(l)
Lythrum salicaria caul. 4. ang.	,,
Sagina erecta *(Moenchia erecta)*	,,
Thymus acinos *(Acinos arvensis)*	St. Vincent's Rocks
Hypericum montanum	,,
Antirrhinum minus *(Chaenorhinum minus)*	,,
Orchis maculata *(Dactylorhiza maculata)*	,,
Poterium sanguisorba	,,
Asplenium ceterach *(Ceterach officinarum)*	Bedminster
Centaurea scabiosa	St. Vincent's Rocks
Glaux maritima	N(ew) Passage
Arenaria marina *(Spergularia marina)*	,,
Chelidonium glaucium *(Glaucium flavum)*	,,
Pastinaca sylvestris *(P. sativa)*	,,
Salicornia europaea	Posset (Portishead)
Chenopodium maritimum *(Suaeda maritima)*	,,
Malva moschata	,,
Ervum tetraspermum *(Vicia tetrasperma)*	Leigh Wood(s)
Verbascum thapsus	,,
Campanula trachelium	,,
Ophrys apifera	,,
Ophrys ovata *(Listera ovata)*	,,
Rubia peregrina	,,
Monotropa hypopithys *(M. hypopitys)*	,,
Prenanthes muralis *(Mycelis muralis)*	,,
Inula dysenterica *(Pulicaria dysenterica)*	Henbury
Aegilops incurva *(Parapholis incurva)*	Banks of Severn
Chenopodium urbicum	Redcliff Fields
Epilobium tetragonum	,,
Sison amomum	Redcliff Meads
Chaerophyllum temulentum	,,
Lathyrus latifolius	Posset Point (Portishead Point)
Lathyrus palustris	,,
Euphorbia exigua	,,
Erigeron acre *(E. acer)*	St. Vincent's Rocks
Epilobium ramosum *(E. hirsutum)*	Hengrove
Hedypnois hispidum *(Leontodon hispidus)*	,,

Gentiana aamorella [sic] *(Gentianella amarella)*	Leigh Wood(s)
Veronica spicata	,,
Carduus acaulis *(Cirsium acaule)*	,,
Carduus crispus *(C. acanthoides)*	,,
Aster tripolium	Hotwells Riverside
Solidago virga aurea *(S. virgaurea)*	,,
Dipsacus pilosus	,,
Galeopsis ladanum	,,
Brassica muralis *(Diplotaxis muralis)*	Coach Yard
Lichen nigrescens *(Collema nigrescens)*	,,
Solanum nigrum	,,
Clavaria muscoides *(Clavulinopsis corniculata)*	Durdham Down
Agaricus aurantiacus *(Lactarius aurantiacus)*	,,
Viscus quercinus *(Viscum album)*	Corston
Lichen floridus *(Usnea florida)*	,,
Peziza coccinea *(Aleuria aurantia)*	Leigh Wood(s)
Lycoperdon fraxineum *(Daldinia concentrica)*	Redland
Peziza atra *(Ascobolus furfuraceus)*	,,
Peziza scutellata *(Scutellinia scutellata)*	,,
Pimpinella dioica *(Trinia glauca)*	St. Vincent's Rocks
Scilla autumnalis	,,
Ophrys spiralis *(Spiranthes spiralis)*	,,
Conyza squarrosa *(Inula conyza)*	,,
Lepidium petraeum *(Hornungia petraea)*	,,
Arabis stricta *(A. scabra)*	,,
Viola hirta?	,,
Lathraea squamaria	,,
Lepidium ruderale	Screw's Hole (Crew's Hole, Hanham)
Aquilegia vulgaris	St. Vincent's Rocks
Arenaria tenuifolia *(Minuartia hybrida)*	,,
Geranium sanguineum	,,
Turritis hirsuta *(Arabis hirsuta)*	,,
Agaricus androsaceus *(Marasmius androsaceus)*	Durdham Down
Orchis maculata *(Dactylorhiza maculata)*	Leigh Down
Scabiosa columbaria	St. Vincent's Rocks
Orchis bifolia *(Platanthera bifolia)*	St. Vincent's Rocks under Cook's Folly
Oenanthe fistulosa	Below K(ings) Weston
Lysimachia nummularia	,,
Hydrocharis morsus-ranae	,,
Scutellaria galericulata	,,
Euonymus europaeus	about Henbury

This list may form a forerunner of the "catalogue of rarer plants, etc., found about St. Vincent's rocks" by Dr. Broughton and published, together with a list of fossils, corals, earths, crystals, metals and marine exuviae, by Barrett (1789). However, the list in the Herbarium book does not include *Gallium* [sic] *montanum, Bupleurum tenussimum* [sic], *Smyrnium olusatrum, Sedum rupestre, Potentilla verna, Ornithosus persiesillus* [sic], *Hippocrepis carnosa* [sic], *Viola livida, Orchys* [sic] *muscifera* and *Polypodium fragile* given in Broughton's catalogue for St. Vincent's Rocks by Barrett (1789), and some of the plants on the list in the Herbarium book are not included in the catalogue.

It seems probable that the list in the Herbarium book stems from Dr. Broughton's own observations in the field, some of which were communicated to William Withering and given in the third edition (1796) of his four-volume *Arrangement of British Plants* (see also White, 1912, p.66). Dr. Broughton and Mr. Ford are mentioned by

Withering with reference to *Arabis stricta* (*scabra*) and *Turritis* (*Arabis*) *hirsuta* on St. Vincent's Rocks. Although rarities such as *Arabis scabra*, *Geranium sanguineum*, *Scilla autumnalis* and *Trinia glauca* were known from St. Vincent's Rocks before the observations of Dr. Broughton, he undoubtedly made several first records for the district, including *Bupleurum tenuissimum* from "Boggy ground at the western end of St. Vincent's rocks, near Cook's Folley" noted by Withering (1796). The list now available strongly suggests that Dr. Broughton was the first recorder of a number of other plants for the Bristol area, among them probably *Chaenorhinum minus*, *Lathraea squamaria* and *Spiranthes spiralis* from St. Vincent's Rocks, *Campanula trachelium*, *Gentianella amarella*, *Monotropa hypopitys*, *Ophrys apifera* and *Veronica spicata* from Leigh Woods and *Chenopodium ficifolium* from Redland. The record of *Veronica spicata* from Leigh Woods is of considerable interest for while this plant was known from St. Vincent's Rocks from 1641 onwards, where it persists in fair quantity, there are no other reports of it from Leigh Woods apart from two this century (1912, 1960). *V. spicata* is now an extreme rarity in Leigh Woods and seldom flowers there.

It is of note that an inventory of plants from St. Vincent's Rocks and neighbourhood published in Shiercliff's *Bristol and Hotwell Guide* (1789) contains a substantial number of the plants on Dr. Broughton's list.

Changed conditions over two centuries have doubtless resulted in the loss of plants from some of the sites which Dr. Broughton mentions, e.g., probably *Anacamptis pyramidalis* from Brislington, and *Scilla autumnalis* is now exceedingly reduced on the Avon Gorge where it has not been seen in flower for several years. There are no recent records of *Minuartia hybrida* from St. Vincent's Rocks or any reports of *Lathraea squamaria* from there, although the latter is now known elsewhere on the Bristol side of the Gorge. *Platanthera bifolia* is probably lost from under Cook's Folly, although it was known on Durdham Down in the first half of the last century (White, 1912). *Moenchia erecta*, not represented in Dr. Broughton's Herbarium book, once existed on Brandon Hill (White, 1912), but has not been reported subsequently from Wraxall.

One or two of the details in Dr. Broughton's list seem open to doubt: the record of *Parapholis incurva* (Banks of Severn) probably refers to *P. strigosa* (these related species were earlier not well understood), and *Lathyrus palustris* at Portishead is perhaps questionable.

Although no "Tomus Secundus" or other collections have been found and uncertainties remain, the appearance of the Herbarium book is most welcome and has helped to make the historical record of Bristol Botany more complete.

ACKNOWLEDGMENT

We are indebted to Mr. P. J. M. Nethercott for helpful comments on this paper.

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Book Review

A Handbook of Water Plants. E. M. Bursche 1968, translated by Hella Czech. pp 128. Frederick Warne & Co., 65p.

The English translation of this book could be better. Many phrases and sentences are so constructed as to be ambiguous ('The small golden yellow flowers of the Cruciferae type have inflorescences with many flowers in corymbs' p 60) or very hard to read. Occasional wrong words are used and this adds to the confusion (p 18– the *variety* of attached organisms is referred to as their *composition* and on p 20 a *simple* leaf shape is defined as an *entire* leaf shape). There are few spelling mistakes (*brachts,* p 33) but two orthographic errors are persisted with throughout the book (*Rumex hydrolaphatum* instead of *Rumex hydrolapathum* and *Riciella* instead of *Ricciella*).

The first quarter of the text is a mixture of detail and generalisation about the aquatic environment and its plants. It also contains a set of simple keys by which the plants dealt with can be identified. The illustrated glossary of terms used in the keys is not related to the remaining text; which increasingly assumes previous knowledge but at the same time ignores its own earlier groundwork (p 73– a *lanceolate* leaf has now become a *lance-shaped* leaf but its base is now *cordate* and the glossary has not explained this term, although five of its illustrations are of cordate-based leaves).

The main descriptive text is liberally and well illustrated but the flower of *Lythrum* (p 62) could have been further removed from the legend for *Hippuris.* It consists of notes on habitats, characteristics and generalities, of which the last are aimed at the interests of fishermen. I consider that a book so potentially interesting to aquarium and water-garden enthusiasts, as well as a wider range of naturalists, deserved much greater care in the pre-issue stages than has apparently been the case. At 65p it is a little expensive when compared with many of the recent colour-illustrated and much more error-free books on plants.

D. Gledhill.

THE STRATIGRAPHY OF THE STONEHOUSE AND TUFFLEY CLAYPITS IN GLOUCESTERSHIRE

By Charles Philip Palmer

SECTIONS in the upper part of the Lower Lias and in the Middle Lias at Stonehouse and Tuffley are described. These sections are correlated with each other and with the succession in the Stowell Park Borehole. A comparison is made with the corresponding part of the succession on the Dorset Coast.

Introduction

Two well known Liassic clay pits in Gloucestershire have long remained in need of detailed description.

The first pit belongs to the Stonehouse Brick and Tile Co. (map ref. S.O. 816050), where approximately 160ft. of clays, capped by the Marlstone Rock Bed, are exposed in a steep but accessible quarry face. This pit appears not to have been previously described, although Richardson (1910, 254 & pl. 3) made several references to it. He included a photograph of the brick works and part of the clay pit together with details of brick-making techniques employed there during the first decade of this century.

The second is the better known, but long disused, pit at Tuffley, Robin's Wood Hill (map ref. S.O. 836149), which has been the subject of two Geological Association Excursion Reports. The first (Watts 1928, 139) was a general account of the fossils found during the time when the pit was being worked. His penetrating observations on the 'life positions' of bivalves and the attitudes of belemnites indicate his awareness of palæoecology, but unfortunately he recorded no stratigraphical details. A more recent Geologists' Association Excursion Guide (Ager 1955, 364) recorded the lithological succession and the stratigraphical position of some of the fossils to be found there.

This pit is cut at two levels; the upper level is beginning to slip and is becoming overgrown, while the lower face, though accessible in the lower part, is nearly vertical from the Capricornus Sandstone up to the floor of the upper level. Approximately 207ft. of clays capped by the Marlstone Rock Bed are exposed in a steep and, in places, rather inaccessible quarry face.

A third pit, about a mile to the south of Stonehouse Station, Samuel Jeffries' Pit (map ref. S.O.816050), is badly slumped and allows no true account of the succession to be recorded *in situ*. However, from an examination of the beds exposed in the face, it is evident that the description of the Stonehouse Pit is applicable to Jeffries' Pit.

The purpose of this work is to place on record descriptions of the first two pits before they fall into disuse and become slumped. The increasing use of the more economical bituminous Callovian shale in the Oxford Clay for brick-making will inevitably lead to the closure of more and more Liassic clay pits.

The clay pit of the Stonehouse Brick and Tile Co. is cut into a mass of Liassic clays slipped down from the Cotswold scarp face. The plane of the slide probably passes through the shallow valley between the top of the clay pit and the Inferior Oolite quarry at the top of Doverow Hill.

It may possibly be objected that the slight unconformity between the Margaritatus and Spinatum Zones is due to either sliding or cambering movements of the Marlstone Rock Bed. The field evidence is not consistent with these hypotheses. The dip-angles of the beds at Stonehouse have been recorded (Ackermann and Cave 1967, 569) as 50° to the northeast and are more or less constant. If the slide plane passed through any part of the quarry face there would be no constancy of dip angles—dips above the slide plane would be steeper. Conversely, if cambering of the Marlstone Rock Bed had taken place then the dip-angle would be reversed—this is not the case at Stonehouse.

The term Dyrham Silts (Ackermann and Cave 1967, 568) is applicable to all the beds from bed 1 at Tuffley to the Marlstone Rock Bed, the only exception being bed 3b at Tuffley which has a high clay content, little silt and the only microfauna seen at the two pits.

A collection of benthic fossils from the two pits will form the basis of a subsequent palaeontological paper.

Description

Clay pit of the Stonehouse Brick and Tile Co. and Jeffries Pit. (S.O.81650).

Lithological succession. Numbers in bold type indicate hard band.

Bed. No.	*Lithology*	*Ft.*	*Ins.*
14b	Marlstone Rock Bed. Soft to hard, buff, micaceous, massive, fine-grained sandstone: diagonally jointed *in situ*, but weathering into large rounded doggers in fallen blocks.	8	6
a	Irregular patches of shells in hard ferruginous, sandy nodules mostly in hollows in the eroded and highly irregular surface of the shale bed below		0–6

EROSION SURFACE AND ABRUPT CHANGE IN LITHOLOGY

Bed. No.	*Lithology*	*Ft.*	*Ins.*
13	Pale grey, shaly clay	14	
12b	Ferruginous, sandy limestone	1	
a	Derived pebbles in basal part of above		3
11	Buff to pale grey micaceous clays with many small fossils, *Amaltheus margaritatus*, *A. subnodosus* and *A. striatus*	22	
10b	Hard, ferruginous, orange-brown, oolitic limestone, with tufa-coated solution cavities along joint planes	2–4	
a	Soft, sandy, ferruginous layer with belemnites and many other fossils. Occasional derived pebbles and scattered ooliths		4
9	Grey, silty shale	12	
8b	Hard, mauve-grey, ferruginous, fine-grained, sandy limestone with much scattered pyrite; large fauna of molluscs, *Amaltheus stokesi*, *Lytoceras sp.*	1	4
a	Many flattened, derived, iron-coated pebbles in basal part of above		4
7	Grey, silty clay	12	
6	Hard, micaceous, blue-centred limestone in centre of pit but passing laterally into hardish, blocky marls, *Amaltheus stokesi*	1	6
5	Thick bed (48ft.) of grey or buff-coloured, silty clays with several lines of ferruginous nodules: divided as follows:—		
e	Grey silty clays with scattered flattish ferruginous nodules	4	
d	Buff-grey, silty clays, *Amaltheus stokesi*	14	
c	Line of ferruginous flattish nodules		4
b	Dark grey clays, rather more silty below than above	30	
a	Light brown, sandy clays with round ferruginous nodules in roughly three layers. Highly fossiliferous	4	
4	Capricornus Sandstone. Hard sandy limestone: fine-grained and ferruginous above, passing downwards into coarse, micaceous, shaly limestone below, *Androgynoceras lateaecosta*, *A. artegyrus*, *Liparoceras divaricosta*	4	4
3c	Pale, grey silty clays	15	
b	Grey and brown silty clays with lines of crushed pectinids, *Androgynoceras cf. maculatum*		1
a	Grey silty clays	2	
2	Dark grey clays with small, fossiliferous limestone nodules		4
1	Grey silty clays seen to	15–20	

Clay pit at Tuffley, Robin's Wood Hill. (S.O.836149). (Modified after Ager 1954: 364).

Lithological succession. Numbers in bold type indicate hard band.

16c	Spinatum layer. Fossiliferous, flaggy sandstone with ferruginous oolitic grains, with *Pleuroceras spinatum* and *Amaltheus* aff. *subnodosus*	4	
b	Massive sandstone weathering into large rounded doggers in places	14	
a	Hard ferruginous sandy nodules with occasional specimens of *Gibbirhynchia micra*		0–6

EROSION SURFACE AND ABRUPT CHANGE IN LITHOLOGY

15	Grey silty shales	17	
14	Ferruginous, oolitic limestone, nodular in lower part; *Amaltheus* spp.	1	6
13	Grey silty shales	21	

Bed. No.	*Lithology*	*Ft.*	*Ins.*
12	Ferruginous limestone, nodular at base, with *Amaltheus stokesi* and *Lytoceras* sp. and large fauna of bivalves and belemnites	1	10
11	Grey silty shales; floor of upper working about 2ft. above the base	12	
10	Ferruginous micaceous limestone, the lower part weathering white	1	
9	Grey silty shales with bands of ferruginous nodules; 53ft. 6in. distributed as follows:—		
g	Grey shales with scattered ferruginous nodules . .	6	
f	Grey silty shales	9	
e	Ferruginous nodules		3
d	Grey silty shales	9	
c	Ferruginous nodules		3
b	Grey silty shales	25	
a	Scattered ferruginous nodules, *Androgynoceras capricornus* . .	4	
8	Band of highly fossiliferous ironstone nodules, forming box-like structures containing yellow sand: *Androgynoceras* . .		4
7	Sandy grey shales	2	
6	Prominent band of hard sandy shales	2 4 to	4 6
5	Grey silty shales	16	
4	Prominent band of ferruginous nodules		6
3	Grey silty shales with 4–6ft. of stiff blue clay at the base. Ironstone nodules, especially in the lower part. Total 49ft. 6in. divided as follows:—		
c	Grey silty shales with some ironstone nodules, especially in the lower part	45	
b	Ironstone nodules in dark blue, sticky clay with *Androgynoceras maculatum* and a rich fauna of foraminifera and ostracoda	6	
a	Dark grey clays passing downwards into grey silty shales	4	
2	Grey indurated sandy shales with crushed bivalves and *Beaniceras cf. luridum.*	1	
1	Grey shales with nodules, recorded by Ager (1954) but not now well exposed.	10	

Ager assigned two bed numbers (11 and 12) to the shales in which the floor of the upper quarry is cut. As they are lithologically continuous they have been united and the beds above renumbered.

Stratigraphy

IBEX Zone, Luridum subzone.

The lowest ammonite collected from the two pits is *Beaniceras* from bed 2 at Tuffley, which, owing to its crushed condition, is tentatively referred to *B. luridum*. The top of the subzone is fixed by the occurrences of *Androgynoceras maculatum* in Bed 3b a few feet above. Hence beds 2 and 3a are assigned to the subzone. Equivalent beds at Stonehouse are not exposed at the time of writing.

DAVOEI Zone, Maculatum subzone.

A. maculatum in 3b at Tuffley fixes the base of the subzone, although no other specimens were collected from higher horizons at that locality. At Stonehouse a poorly preserved *Androgynoceras* of the *A. maculatum* type was collected from bed 3b. Hence beds 1–3 at Stonehouse and beds 3b–5 at Tuffley are assigned to this subzone. In Dorset this division attains a mere 9ft.with *A. maculatum* ranging throughout and abundant in the lower part. In Gloucestershire it is about 70ft., and in the Stowell Park borehole *A. maculatum* has been recorded between 927ft. and 985ft.

DAVOEI Zone, Capricornus subzone.

Bed 4 at Stonehouse and beds 6, 7 and 8 at Tuffley yield the bulk of the better preserved ammonites of the genus *Androgynoceras* and the dominance of *A. lataecosta* and *A. artigyrus* indicates that these beds belong to this subzone. However, the overlying sandy clays with ferruginous nodules, 5a at Stonehouse and 9a at Tuffley, yield fragments of *A. capricornus* that are already showing projected ribs on the venter, thus marking the highest part of the Capricornus subzone (Spath 1938, 152). In the Dorset coast this division is 50ft. thick, while at Stonehouse and Tuffley it is about 8ft. But at Stowell Park it is 29ft., and this expansion is reflected in the reduction of the "Capricornus sandstone," which is there only an indurated shelly layer of 1ft. 5in. (Green 1956, 41). The nodules above at 890/3 are taken as equivalent to 5a at Stonehouse and 9a at Tuffley (and possibly the Red Band in the Dorset Coast?).

DAVOEI Zone, Figulinum subzone.

At Stonehouse no ammonites have been seen in the thick bed of clays 5b and the overlying nodule band 5c, but at the southern end of the pit, in an abandoned part of the working face, a sandy seam in 5d, roughly 2ft. above 5c, yielded a fragment of *Amaltheus stokesi*. The base of the Margaritatus zone is consequently placed at the base of 5d, and the 30ft. of sandy clays, 5b and 5c, are included in the Figulinum subzone. At Tuffley beds 9b and c are included in this subzone. Although *Oistoceras* has not been recorded from the Cheltenham/Stroud area this arrangement is supported by the Stowell Park Borehole both in the similar thickness, (30ft. Stonehouse, 44ft. Stowell Park, and 40ft. Dorset Coast) and by the similar positions compared with the Stowell Park borehole where the nodules at 844–848ft. are taken as equivalent to 5c at Stonehouse and 9c at Tuffley.

MARGARITATUS Zone, Stokesi subzone.

Well preserved *A. Stokesi* are found in beds 6 and 8 at Stonehouse and smaller crushed examples occur in clays 5d–e and bed 7. Hence beds from 5d up to the top of 9 at Stonehouse are included in this subzone, and, by analogy, beds 9d up to the top of 13 at Tuffley. These beds are taken as equivalent to the clays between 746/8 down to 844ft. at Stowell Park, and the nodules in 5e at Stonehouse and 9g at Tuffley are clearly equivalent to the nodules between 791/5 and 811/1 ft. at Stowell Park. If this arrangement is correct then the whole of bed 5 at Stonehouse and bed 9 at Tuffley is equivalent to the sandy clays between 791/8 and 894/9ft. at Stowell Park. Hence the sandstone at 791ft. at the latter locality is equal to bed 6 at Stonehouse and bed 10 at Tuffley. The clays between 746/8 and 790/6ft. at Stowell Park are included in this subzone, although it is not certain that the septarian nodule found at 762ft. is the lateral equivalent of bed 8 at Stonehouse and bed 12 at Tuffley.

MARGARITATUS Zone, Subnodosus subzone.

Numerous crushed nodate Amaltheids are to be found in the pale grey clays of bed 11 at Stonehouse. These are referable to *A. subnodosus* and *A. striatus*. Small inner whorls of *A. margaritatus* are to be found in the basal part of bed 10 at Stonehouse, and a specimen of *A. margaritatus* found by Ager in the equivalent bed at Jeffries Pit indicates that the base of this subzone should be drawn below bed 10 at Stonehouse and bed 14 at Tuffley; it extends up to the base of the Marlstone Rock Bed at both localities. At Stowell Park there can be little doubt that the oolitic limestone between 737/10 and 744/9ft. is equivalent to beds 10 at Stonehouse and 14 at Tuffley. At Stowell Park the 2ft. current-bedded sandstone lying below the oolitic limestone is included in this subzone.

MARGARITATUS Zone, Gibbosus subzone.

No evidence for this subzone has been discovered at either pit.

SPINATUM Zone

Following Ager (1954) the base of this division is taken at the first appearance of the small Rhynchonellid *Gibbirhynchia micra* in the shelly nodules 14a at Stonehouse and 16a at Tuffley. This brachipod occurs in the lower part of the Marlstone Rock ·Bed throughout the Midlands (Ager 1954, 27) and is, at Stonehouse, present at the base and ranges upwards about 8ft., thus covering most of the exposed Marlstone Rock Bed at that locality. The fossiliferous layer at Tuffley yielded a specimen of *Pleuroceras spinatum*, but as the zone index also occurs in the upper part of the Apyrenum subzone (Howarth 1958, 39) this cannot be accepted as conclusive evidence for the presence of the Hawskerense subzone.

Correlation

Direct lithological correlation between Stonehouse and Tuffley is straight-forward because of the remarkable constancy of the beds, even though the two pits are separated by nearly seven miles.

Bed 4 at Stonehouse corresponds with 6, 7 and 8 at Tuffley where the upper part of the Capricornus Sandstone is there strongly indurated with iron, forming the distinctive ironstone bed 8. The micaceous shales below bed 8 are indurated in the lower part forming bed 6, while the softer upper part forms bed 7. Thus three beds are separable at Tuffley while only one is clearly recognisable at Stonehouse.

Bed 5 at Stonehouse is obviously equivalent to 9 at Tuffley, but no nodule bed equivalent to 9c at Tuffley can be detected at an equivalent distance above 5c at Stonehouse. The ferruginous nodules at the base, 5a at Stonehouse and 9a at Tuffley, contain two forms of *Pleuromya* in the life position at both localities. These were probably the bivalves 'erect as in life' referred to by Watts (1928, 139).

Beds 6, 8 and 10 at Stonehouse correspond respectively to beds 10, 12 and 14 at Tuffley. Beds 8 at Stonehouse and 12 at Tuffley are identical even to the slightly mauve colour seen on a freshly fractured surface, and the presence of pyrite. Beds 10 at Stonehouse and 14 at Tuffley are equivalent by virtue of their oolitic structure and tufa-coated solution cavities eroded along joint planes.

There is no trace of a limestone in the clays above bed 14 at Tuffley to correspond with the highest limestone, bed 12, at Stonehouse. Its absence at Tuffley may indicate that the erosion surface, upon which the Marlstone Rock Bed rests, is stratigraphically lower at Tuffley than at Stonehouse. That is, the Rock Bed rests on an eroded surface of the shales of bed 13 at Stonehouse, whereas at Tuffley it rests on the eroded surface of shales equivalent to bed 11 at Stonehouse.

The alternative interpretation, that either bed 10 or 12 at Stonehouse is intercalated, would have equal weight if there were no abrupt change of lithology above the Margaritatus clays at both localities. But the following evidences argue against it:—

(1) The fauna, oolitic structure and tufa-coated solution cavities present in 10 at Stonehouse and 14 at Tuffley indicate strongly that the two beds are equivalent, therefore bed 10 at Stonehouse is not intercalated. Considering the lateral constancy of the beds described above, it would be surprising if there were a "sudden" intercalation of a thick limestone (bed 12) at Stonehouse in shales (beds 11 and 13) amounting to 36ft. which would have to be considered equivalent to bed 15 at Tuffley, but there extending to only 17ft. Therefore it is improbable that bed 12 at Stonehouse is intercalated.

(2) The apparent absence of the Gibbosus subzone from both localities can be explained by the erosion surface at the base of the Spinatum Rock Bed. Deposits of this subzone were probably removed by erosion during late Margaritatus times, resulting in an erosion surface that is 37ft. above the oolitic limestone at Stonehouse, 17ft. above the equivalent bed at Tuffley and only 8ft. 7in. above an equivalent oolitic limestone at 737ft. in the Stowell Park borehole.

The absence of any ammonite evidence for the Gibbosus subzone and the lithostratigraphical evidence in favour of a slight angular unconformity between the Margaritatus Shales and the Rock Bed is further strengthened by two more examples:—

(1) At Roxby Mine, north of Scunthorpe, Lincs. (map ref. SE.705177) the sandy nodules at the base of the Spinatum Rock Bed of the Midlands are represented by about 14in. of shelly sands and indurated shales with *Gibbyrhynchia*. Above is the Rock Bed, while below are clays with *Androgynoceras* sp. but no *Oistoceras*. Thus a non-sequence at Roxby cuts out the whole of the Margaritatus Zone and the Figulinum subzone.

(2) Ager (1954, 27), on the known distribution of the rhynchonellid brachipods *Gibbirhynchia muir-woodae* and *G. amalthei*, deduced:—"that only the lower part of the Middle Lias is present in Kent. Thus in the Elham boring described by Lamplugh, Kitchin & Pringle (1923) the 'hard grey limestone' at the top of the Middle Lias was found to contain *G. muir-woodae* whilst the overlying greenish grey sandy limestone contained a *Gibbirhynchia* close to *G. amalthei*. A similar distribution occurred in all the other cores examined, suggesting a wide-spread break at this level, due presumably to post-Domerian erosion in the vicinity of the London-Ardennes ridge."

Evidently the non-sequence at Gloucestershire is widespread and extends northwards as far as the Market Weighton "axis" and eastwards to the Kent area.

An alternative hypothesis is here offered to Ager's "post-Domerian erosion in the vicinity of the London–Ardennes ridge."

That erosion began in late Margaritatus times in Gloucester, the Midlands, North Lincolnshire and Kent. Erosion cut deeper, down to the Davoei Zone, in North Lincolnshire, but only down to the Margaritatus Zone in Gloucestershire, the Midlands and Kent. Erosion ceased before deposition of the Rock Bed, except in Kent, where it continued during Spinatum times.

The Marlstone Rock Bed of Gloucestershire is a local sandy development of the typical Marlstone which, in the Midlands, is normally displayed in the lower part as a sandy limestone, and in the upper part as a ferruginous oolitic limestone.

At Tuffley and Stonehouse the lower beds are sandy with crinoid ossicles, but no ooliths, while the flaggy upper layer contains *Pleuroceras spinatum*, *Lobothyris punctata* and ferruginous ooliths.

Hallam (1955, 21) showed that in Leicestershire the upper 2ft. 9in. of the ironstone contains *Dactylioceras* and quite logically concluded that the base of the Toarcian should be drawn in the Rock Bed, and that deposition of iron continued, in that region, into Toarcian times.

At Tuffley the well displayed "Marlstone platform" immediately above bed 16c makes it unlikely that higher parts of the Rock Bed are present, so that all of the Rock Bed is there of Spinatum age and equivalent to the Sand Rock of the Midlands.

Correlation with the Dorset Coast

It is possible to suggest that two of the beds in the Margaritatus Zone at Stonehouse and Tuffley can be very tentatively correlated with similar beds in the Dorset Coast.

(1) At Stonehouse bed 10 marks the first appearance of *Amaltheus margaritatus*, while *S. subnodosus* and *A. striatus* occur in the clays above. In Ridge Cliff, between Seatown and Eype, Dorset, the Margaritatus Stone (bed 24 in Howarth 1957) marks the first appearance of *A. margaritatus*, while *A. subnodosus* occurs in the clays above. Both bed 10 at Stonehouse and the Margaritatus Stone at Seatown contain small and rare Trochid gastropods which, though not stratigraphically important, indicate the ecological probability of a gastropod-tolerating environment extending simultaneously over a wide area.

(2) Again, at Stonehouse, the form of *A. stokesi* found in the micaceous sandy limestone of bed 6 is of the same type that is found in the Eype Nodule Bed in the Stokesi subzone of the Dorset Coast. But in bed 8 at Stonehouse specimens of *A. stokesi* are more closely and finely ribbed than those found below in bed 6, and they correspond very closely to specimens collected by the author from Day's Shell Bed (Palmer 1966), which occupies the same relative position to the Eype Nodule Bed in Dorset as bed 8 at Stonehouse does to bed 6 below.

To support this tentative correlation it may be noted that:

(a) In Day's Shell Bed in Dorset, *Cardinia*, *Sphaeriola* and *Myaconcha* make a sudden appearance and range upwards into the Spinatum Zone.

(b) In bed 8, Stonehouse, *Cardinia*, *Sphaeriola* and *Myaconcha* all make a sudden appearance and range upwards. These bivalves have no stratigraphical value, but it seems likely that ecological conditions were, on ammonite evidence, widespread, and extended isochronously from Dorset to Gloucestershire with perhaps an ecological break across the Mendip axis.

Conclusions

(1) During Davoei and Margaritatus times sedimentation was subject to little lateral variation in the Gloucestershire area, so that bed by bed correlation is possible between Stonehouse and Tuffley on lithostratigraphical evidence alone, without reference to ammonites. To a more limited extent this is also true of the Stowell Park borehole.

(2) No evidence can be found for the presence of either the Figulinum or the Gibbosus subzone in Gloucestershire. Comparison with the Stowell Park borehole suggests that deposits of the former were present, while the postulated Margaritatus/Spinatum unconformity argues that deposits of the latter are missing.

(3) A non-sequence in Gloucestershire between the Margaritatus and Spinatum Zones points to an unconformity between the Margaritatus Clays and the Spinatum Rock Bed. The resulting erosion plane appears to be widely distributed in the Midlands Province (between the Mendips and the Humber) and eastwards into Kent. But in the Yorkshire basin and the Dorset coast the sequence in the Margaritatus Zone is apparently complete.

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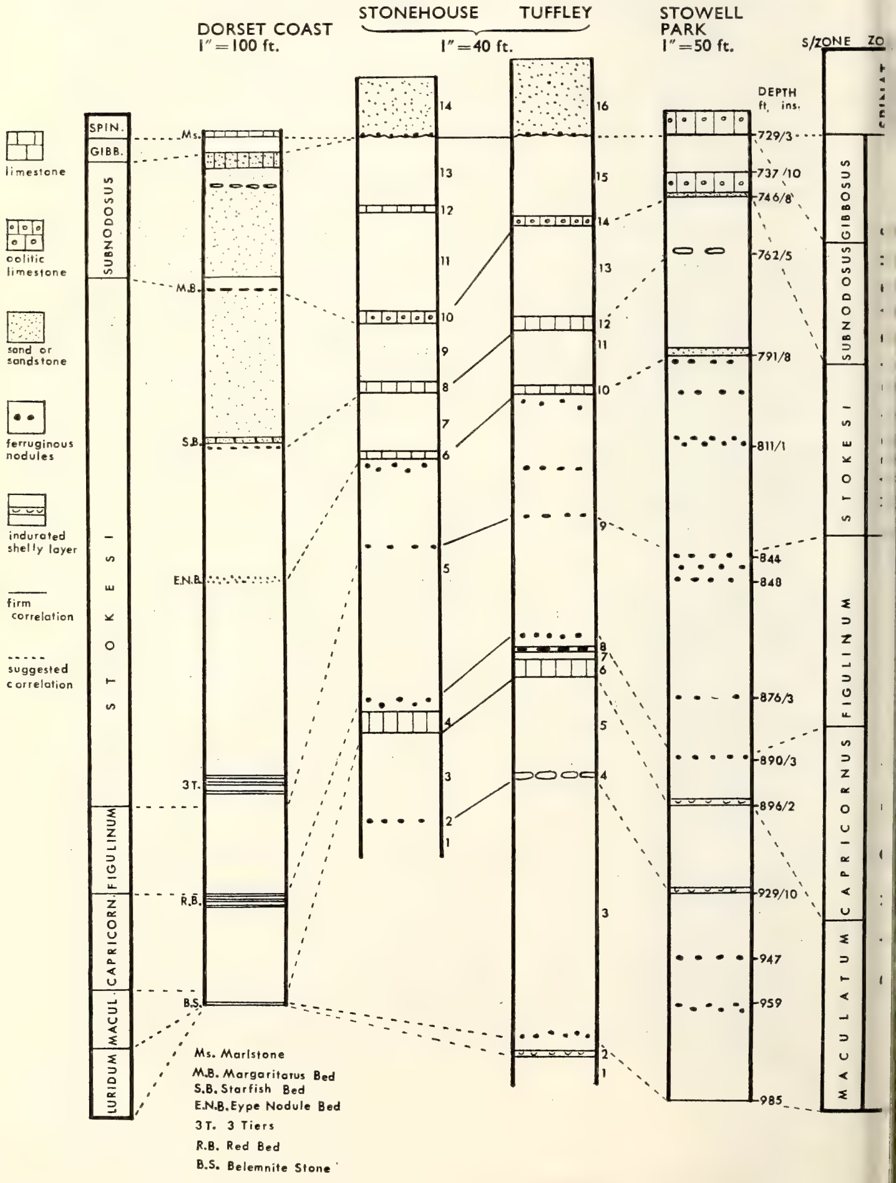
DORSET COAST
1″=100 ft.
STONEHOUSE
TUFFLEY
1″=40 ft.
STOWELL PARK
1″=50 ft.
S/ZONE
ZO
DEPTH ft. ins.
SPIN.
GIBB.
SUBNODOSUS
STOKESI
FIGULINUM
CAPRICORN.
MACUL.
LURIDUM
GIBBOSUS
SUBNODOSUS
STOKESI
FIGULINUM
CAPRICORNUS
MACULATUM
limestone
oolitic limestone
sand or sandstone
ferruginous nodules
indurated shelly layer
firm correlation
suggested correlation
Ms.
M.B.
S.B.
E.N.B.
3T.
R.B.
B.S.
14
13
12
11
10
9
8
7
6
5
4
3
2
1
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
729/3
737/10
746/8
762/5
791/8
811/1
844
848
876/3
890/3
896/2
929/10
947
959
985
Ms. Marlstone
M.B. Margaritatus Bed
S.B. Starfish Bed
E.N.B. Eype Nodule Bed
3T. 3 Tiers
R.B. Red Bed
B.S. Belemnite Stone

REPORT ON A TURBO-DRILL BOREHOLE AT SEVERNSIDE

By T. R. Fry

During 1966 drilling was commenced at Severnside by Bristol Siddeley-Whittle Tools Ltd., for the purpose of testing their new turbo-drill. Nat. Grid Ref.: (ST 54878400).

One deep borehole and several lesser ones were made on the same site.

Samples of the rocks penetrated were sent to the Department of Geology at the University of Bristol for examination as the work progressed; these consisted mainly of debris recovered from the washings at intervals of every ten feet but a few solid cores were also obtained. A detailed record of a general geological character was also prepared, mainly from the deepest borehole and is lodged with the Editor of these *Proceedings*.

The lines of bedding shown by the cores indicated the dips as follows:

Depth	Dip
1670′	10°
2430′	20°
2722′	nil
3031′	15°–20°

No information was forthcoming from above 1670[1]. It was not possible to obtain any information as to direction of the dips.

General Summary of Information

(The age of the formations and their thicknesses must be regarded as suggestive and approximate only).

Depth in Feet From	To	**Formation**	**Thickness in Feet**
		Recent and Pleistocene	
0	80	Alluvial deposits of mud, peat, sand and gravel	80
		Triassic	
80	170	Keuper Marl	90
		Coal Measures	
170	760	Pennant Sandstone	590
		? Breccia	
760	790	The true character and age could not be made out from the washed aggregate, but a core taken later indicated a fault breccia at 740′.	
		Carboniferous Limestone Series	
790	860	Clifton Down Mudstone	70
860	1020	Black Rock Limestone	160
1020	1400	Lower Limestone Shale	380
1400	1510	Shirehampton Beds (including Bryozoa Bed)	110
		Old Red Sandstone Series	
1510	1860	Upper Old Red Sandstone (Portishead Beds)	350
1860	2620	Lower Old Red Sandstone (Brownstone Group)	760
2620	3260	?Lower Old Red Sandstone (Division indeterminate)	640
3260	3340	?Lower Old Red Sandstone (St. Maugham Group)	80

THE SPIDER FAUNA OF STEEP HOLM

By B. J. Chase

THE spider fauna of Steep Holm was investigated during short periods in August 1968 and 1969. The only previous records are from 1938, when J. E. Hamilton made a collection of land invertebrates, excluding insects. He passed the collection to A. R. Jackson for identification.

Steep Holm appears to be an unusual and changing island habitat; little has remained stable and untouched for any great length of time. The factors that have contributed to this change are (i) its occupation at various times by the army and their associated buildings and fortifications, all of which are now in ruins apart from the barracks and the ammunition bunkers. (ii) periodic farming and cultivation of the central plateau, and (iii) the disturbance caused by the gull and rabbit populations. The breeding colony of gulls have contributed to the disturbance of the ground level flora and the rabbits have now eradicated all the large areas of grass leaving only small patches of about 1 sq. ft. in size and these are very closely cropped.

The dominant plant species are nettles, privet, elder, sycamore, Alexanders (*Smyrnium olusatrum*) and *Parietaria.* On three sides of the island there are areas of loose rock scree leading up to the cliff edges. These environmental factors have influenced the range of spiders to be found on Steep Holm. The island's size is in itself a limiting factor for maximum possible densities of species. Stable areas of leaf litter, grass and other vegetation would, if present, support a much greater range of species than at present. The possibility of a fluctuating representation must be borne in mind, since aerial dispersion is a common means by which the young of many species are distributed and the island is within reasonable distance from the mainlands of England and Wales for arrival by this method. Examination of the species list (inevitably incomplete) suggests that several common species have failed to colonize the island. An example of this is the recording of *Linyphia triangularis* in 1969, a spider of the Linyphiid family having a characteristic and easily recognized web which is usually found to be common in approximately the same situations as *Meta segmentata. M. segmentata* is abundant on Steep Holm but to date only one isolated female of *L. triangularis* has been recorded.

The spiders

The two most unusual specimens found were *Oxyptila blackwallii* and *Segestria bavarica. O. blackwallii*, which was found under a stone on the cliff path on the south side of the island, is a county record for Somerset and is uncommon only being found in coastal areas in southern counties. *Segestria bavarica* was found to be common on the south side of the island: it was thought to be very rare on the mainland, however it has been recently found in several places on the coasts of Cornwall, Dorset, the Isles of Scilly and Lundy Island and is abundant on the peninsulas of Sand Point and Brean Down in Somerset. These locations and the ones above indicate that *S. bavarica* has specific habitat requirements. These are cracks and crevices in south-facing rocks and cliffs above the wave-splash zone. The web of *S. bavarica* is characteristic since it builds a tubular retreat leading for a distance of 100–150 mm (4–6 inches) into a crack in the rock. The open end of the web is level with the rock face and has up to a dozen or so radiating strands which serve as trip-wires for the spider's prey. *S. bavarica* may well have been overlooked in the past due to its superficial resemblance to *Segestria senoculata*, the immatures and webs of both species are similar. However, *S. bavarica* can be identified in the field by examining the rounded dark lobes on the dorsal surface of the abdomen. In *S. bavarica* these have pale areas within the lobes and on the ventral surface of the abdomen there is a broad black central band. Both these features are lacking in *S. senoculata*. The majority of specimens were found on the south side of the island where there are sheltered and sunny stretches of rock scree and privet. The areas between Split Rock and Tower Rock proved to be especially productive.

The area above Calf Rock contains a large colony of *Atypus affinis*. This spider, the only British member of the *Mygalomorphidae*, lives almost all its life within a silk tube of approx. 150 mm in length. The greater part of the tube is buried in the earth, a section of about 30 mm protrudes above the ground and merges with the undergrowth, looking rather like a piece of dead twig. *A. affinis* has large and powerful chelicerae and fangs that enable it to excavate a burrow in which it spins its tube. It has adapted to the lack of any great amount of undergrowth and natural cover by spinning the aerial portion of its tube along the edges of rocks and poking out into crevices. Three of the tubes excavated contained recently hatched young that had not yet undergone their first moult. The average size of the adults was approx. 20 mm. Several miniature tubes of young spiders were noted. Sample digging in selected areas give an estimated population of approximately 5,000 specimens.

The rock screes between Split Rock and Calf Rock provides an ideal habitat for the *Salticidae* species. In this area *Salticus scenicus* and *Heliophanus cupreus* are abundant.

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THE VEGETATION OF STEEP HOLM, BRISTOL CHANNEL

By P. Bridgewater

I. Introduction

STEEP Holm has long fascinated naturalists of all persuasions, but notably botanists and ornithologists. The first recorded visit by a botanist was that of W. Turner in 1562 (Turner, 1568), while the first complete account of the vegetation was attempted by McLean and Hyde (1924), followed in 1939 by the excellent account by Skene. Both of these accounts, made in the period following the cessation of agriculture, include many species typical of limestone grassland, which have now disappeared. Moss (1907) included the island as 'natural pasture' on his vegetation map of the area, although this is now obviously not the case.

After Skene's work, there was little published until the species list of Graham (1964), and Gillham's (1963) comparative account of the effects of sea birds on several sites in the Bristol channel.

Poulding (1965) included a more formal classification of the island's vegetation, with specific reference to bird habitats. More recent publications have been those by Bridgewater (1967, 1968), which discuss a provisional classification, with reference to historical factors in the development of the vegetation.

The purpose of this paper is to present a classification of the island's vegetation, based on the results of surveys in 1966 and 1969, using the methods of the Zürich–Montpellier system of phytosociology (Braun–Blanquet, 1964).

II. Phytogeographical position of the Island's flora

In this section, the species lists of Graham (1964, 1966), with one or two additional species added by the author during the visits of 1966 and 1969, have been analysed into the geographical elements proposed by Matthews (1937). The results are set out below:

Introductions		15*
Oceanic South element	10	
Oceanic West element	8	
Oceanic North element	5	
		23

Continental element	2	
Continental South element ..	6	
Continental North element ..	1	
		9
European, Eurasian and Cosmopolitan elements		111
Total number of species		158

*Of this component, 3 species are typically Continental Southern, and 1 Mediterranean in distribution.

There is, therefore, a pronounced Southern/Oceanic distribution group in the island's flora.

III. Vegetation

(a) Physical characteristics of the Island

Elliptical in outline, the island is approximately 950 yards long, and 350 yards wide at its widest point. Geologically, the island consists of a single series (Avonian) of Carboniferous limestone. This is exposed as the steep sea cliffs, which rise to the rather more level plateau.

Human activity can be recognised by the numerous relics of Army occupation, from the 'War scare' of the 1860's to the second World War.

(b) Community descriptions

Eight plant communities have been recognised, five of which are well defined, with three rather 'fragmentary' units. Table I gives the floristic composition of these communities, derived from a series of sample 'lists' made during the visits of 1966 and 1969. The number of 'lists' comprising each community is shown.

(1) *Lavatera arborea* community

Identifying species: *L. arborea*, *Crithmum maritimum*, *Umbilicus rupestris*, *Parietaria judaica*.

This community represents the typical sea cliff vegetation. Plant cover is usually rather sparse, because of the cliff's inhospitable habitat. The community is best developed on the south side of the island, where several species with southern affinities flourish. Two variants of the community were noted: (i) differentiated by *Inula crithmoides* and *Limonium binervosum* and (ii) by *Sedum acre* and *Festuca ovina*.

TABLE I: Floristic composition of the vegetation, showing species constancy for each community.

Community number:	1	3	4	5	6	2	7	8
Number of lists:	7	10	20	6	5	3	2	2
Smyrnium olusatrum	I	IV	V	V	V	+	+	+
Urtica dioica . .		V	V	V	II	+	+	+
Lavatera arborea . .	V							
Crithmum maritimum	IV							
Umbilicus rupestris . .	IV							
Parietaria judaica . .	IV	V	I			+		+
Urtica urens		V	II	I			+	
Carduus tenuiflorus . .		V	I				+	
Poa annua		IV	II				+	
Senecio vulgaris . .		IV	III				+	
Conium maculatum . .		III	IV		IV			+
Glechoma hederacea . .		II	V	II				+
Cirsium vulgare . .			IV					
Mercurialis annua . .			IV	II				
*Rubus fruticosus** . .	I			IV	III	+		
Ligustrum vulgare . .				V	V			
Acer pseudoplatanus . .					V			
Mercurialis perennis . .				II	IV			
Phyllitis scolopendrium					V			
Rhynchostegiella tenella					IV			
Scorpiurium circinatum					IV			
Sedum acre	III					+		
Festuca ovina . .	II					+		
Inula crithmoides . .	II							
Limonium binervosum	II							
Dactylis glomerata . .	I				I	+		
Polypodium interjectum						+		
Helictotrichon pratense						+		
Hyoscyamus niger . .		III	I					
Anchusa arvensis . .		III						
Erodium maritimum		III					+	
Arctium minus . .		I	III				+	
Euphorbia lathyrus . .			I					
Reseda luteola . .			I					
Coronopus didymus . .			I				+	
Iris foetidissima . .			II		III			
Paeonia mascula . .					I			
Raphanus maritimus . .			I					
Sonchus oleraceus . .		I	II					
Senecio jacobaea . .		I						
Sambucus nigra . .				III	III			
Hereda helix . .				II				
Allium ampeloprasum				II				
Teucrium scorodonia . .								+
Arum maculatum . .				II				

* mostly *R. ulmifolius* Schott.

Additional species (noted once only in each of the communities)

Lavatera arborea community:—*Cochlearia officinalis, Plantago coronopus, Bromus mollis.*

Dactylis glomerata community:—*Lotus corniculatus, Agrostis stolonifera, Camptothecium lutescens, C. sericeum, Porella platyphylla, Chelidonium majus, Cheiranthus cheiri, Asplenium trichomanes, Grimmia pulvinata, Geranium robertianum.*

Smyrnium olusatrum community:—*Anagallis arvensis, Scrophularia nodosa.*

Acer pseudoplatanus community:—*Rosa canina, Primula vulgaris, Myosotis ramosissima, Asplenium adiantum-nigrum.*

The Roman numerals used in the body of the table represent the % presence of the species in the community, as detailed below:—

I = species present in 1 — 20% of the sample lists
II = ,, ,, ,, 21 — 40% ,, ,, ,, ,,
III = ,, ,, ,, 41 — 60% ,, ,, ,, ,,
IV = ,, ,, ,, 61 — 80% ,, ,, ,, ,,
V = ,, ,, ,, 81 — 100% ,, ,, ,, ,,

In the case of fragmentary units (i.e. communities 2, 7 and 8), identifying species are indicated by the + symbol.

Variant (i) is commonest on the most exposed cliffs, usually regularly subject to salt spray from the sea, whereas variant (ii) is usually confined to the higher cliffs, not so subject to salt spray.

(2) *Dactylis glomerata* community

Only three species lists were made in this vegetation, which represents limestone crags, not directly part of sea cliffs. The major identifying species are: *D. glomerata*, *Polypodium interjectum*, *Festuca ovina*, *Sedum acre*, *Helictotrichon pratense*.

(3) *Urtica urens* community

Identifying species: *U. urens*, *Parietaria judaica*, *Carduus tenuiflorus*, *Poa annua*, *Senecio vulgaris*, *U. dioica*, *Smyrnium olusatrum*.

This community, with the one following, are the most important on the plateau and sloping cliff tops on the south side, and, consequently, form the vegetation most influenced by the gull population.

Two rather distinct variants were noted: (i) differentiated by *Hyoscyamus niger*, *Anchusa arvensis*, *Erodium maritimum*, and, to a lesser extent, by *Glechoma hederacea* and *Senecio jacobaea*. This corresponds to the "seasonally bare areas" described by Gillham (1963), i.e. the soil is more or less completely exposed before germination of nettle in spring.

Variant (ii), differentiated by *Senecio vulgaris*, *Conium maculatum*, and, occasionally, *Glechoma hederacea*, forms a 'closed cover' vegetation at the western extremity of the island (near Rudder Rock).

(4) *Smyrnium olusatrum* community

Identifying species: *S. olusatrum*, *Cirsium vulgare*, *Mercurialis annua*, *Glechoma hederacea*, *Urtica dioica*, *Senecio vulgaris*, *Conium maculatum*.

Many authors have pointed to this community as Steep Holm's most unusual form of vegetation. Skene (1939) notes that "the most interesting feature of the vegetation is . . . the 'meadow' of *Smyrnium olusatrum* on the plateau. . . At present it forms, with a few other plants, a society which is certainly unique in this country." Despite this, Gillham (1963) records a similar vegetation on Puffin Island off Anglesey.

Three variants of the vegetation were noted: (i) differentiated by *Arctium minus*, and typically confined to the plateau, (ii) differentiated by *Urtica urens*, *Poa annua* and, less frequently, *Parietaria judaica*, occurring where the plateau slopes to the south cliffs, and eventually forming the *Urtica urens* community, and (iii) differentiated by *Euphorbia lathyrus*, *Reseda luteola* and *Coronopus didymus*. This third variant is rather restricted, being confined to footpaths in the area of the barracks.

(5) *Ligustrum vulgare* community

Identifying species: *L. vulgare*, *Rubus fruticosus* agg., *Smyrnium olusatrum*, *Urtica dioica*.

Though this encompasses all the 'scrub' vegetation of the island, it is easily divisible into a rather distinct variant, differentiated by *Sambucus nigra*, *Glechoma hederacea*, *Mercurialis perennis*, *M. annua* and *Arum maculatum*, representing the more nitrophilous areas (cf. Gillham, 1963), and the typical community, found chiefly on the north and east slopes.

One of Steep Holm's more unusual plant species is found in association with this community, viz. *Allium ampeloprasum*. In fact, it grows at the edge of scrub vegetation, where this abuts onto loose, open, soil, which supports a few plants of *Smyrnium olusatrum* and *Urtica dioica*. This loose soil is extremely unstable, the cliffs of Tower Rock contributing to this instability with limestone fragments in a 'scree' at the cliff base.

This whole area can be classified as a 'sharp boundary' situation, between the scrub and loose soil, with *Allium ampeloprasum* located in the boundary itself. Bellamy *et al.* (1969) have indicated that such sharp boundaries support many rare species in Upper Teesdale, Co. Durham.

It therefore seems likely that the existence of *A. ampeloprasum* is dependent on unstable conditions surrounding it—a useful point in conservational considerations.

(6) *Acer pseudoplatanus* community

Identifying species: *A. pseudoplatanus*, *Rubus fruticosus* agg., *Mercurialis perennis*, *Conium maculatum*, *Phyllitis scolopendrium*, *Smyrnium olusatrum*.

Representative of 'woodland' at the east end of the island, this community includes most of the bryophytes and ferns found on Steep Holm.

In addition, Steep Holm's most celebrated rarity, *Paeonia mascula*, is found in this woodland. In 1969, only a few plants were noted.

This plant, like *Allium ampeloprasum*, seems favoured by unstable sites. The species would probably survive better in an open site, comparable to its natural habitat in the Mediterranean.

(7) *Coronopus didymus* community

Only two lists were made in this vegetation, found as a close rabbit-cropped 'lawn' at the west end of the island (Rudder Rock).

Identifying species are: *C. didymus*, *Erodium maritimum*, *Carduus tenuiflorus* (rosettes only), *Poa annua*, *Urtica urens*, seedlings of *Smyrnium olusatrum.*

(8) *Teucrium scorodonia* community

Again only two lists were made, and the following identifying species noted: *T. scorodonia*, *Parietaria judaica.*

This community must be regarded as the final degradation stage of the "close turf of fescues, yellow stonecrop, ground ivy and wood sage" reported by Skene (1939).

Because of the rather homogeneous nature of Steep Holm's vegetation, the individual communities have fairly sharp boundaries, and the vegetation is thus easily placed in one of the above communities.

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TRITYLODONTID INCERTAE SEDIS

By R. J. G. Savage
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Savage & Waldman (1966) published a note on the occurrence of a tritylodontid in a Lower Jurassic fissure at Holwell quarry, near Shepton Mallet, Somerset. They identified the maxilla as *Oligokyphus*, without a specific appellation, and made comparison with the rich *Oligokyphus* material described by Kühne (1956) from a Lower Jurassic fissure in Windsor Hill quarry, about seven miles west of Holwell.

Since the publication Professor W. G. Kühne and Dr. J. A. Hopson have queried the identification (pers. comm.). During the past year fresh falls at the now disused Windsor Hill quarry have enabled me to make a collection of *Oligokyphus* material, so that I have had at hand for comparison with the Holwell specimen good maxillary dentitions. Unfortunately, the Holwell quarry has not yielded any more tritylodontids.

In Table I all the known tritylodontid species are listed with their relevant characteristics. An examination of these demonstrates how difficult it is to identify the Holwell specimen and how indefinite are some of the genera.

The character of length versus width of the post-canine teeth is the most decisive. In *Oligokyphus* the length exceeds the width; in all other genera width exceeds length. The Holwell specimen falls in the latter category, thus eliminating *Oligokyphus* as a possible generic identification.

In adults the number of postcanine teeth is usually six to seven, but the rates of loss and replacement may affect the number appreciably. *Lufengia* with five and *Tritylodontoideus* with nine are the exceptions in the list and the Holwell specimen can on this and other characters be said to be sufficiently different to warrant exclusion from these two genera.

The genus *Chaleopotherium* is based solely on a broken postcanine from Wurtemberg. There is disagreement about the cusp interpretation; probably it had two on the outer and three on the middle row, with the inner row missing. However it is so inconclusive that it contributes nothing to our knowledge of the group.

The four remaining genera are comparable with the Holwell specimen in having six to seven postcanine teeth and in having their width in excess of the length. Size does not appear to be a generic character, since in *Bienotherium* where four species are described there is a large size range. Stratigraphically the precise level is often in doubt and the total range is small, Upper Triassic to Middle Jurassic. The only character remaining is the number of cusps on each of the three rows on the postcanine teeth. This number, when a large number of specimens is available, is seen to vary, (i) from individual to individual and (ii) along the tooth row in a jaw. Often a cusp may be only partially developed, and different authors may give different figures for the same specimen. The complete count for the Holwell specimen is as follows:—

Holwell UB 19046 Right maxilla

	Measurements in mm		Number of cusps		
	a–p	trs	outer	middle	inner
PC 1	—	—	—	—	—
PC 2	4·3	5·0	2+a	3+a	3
PC 3	4·0	5·0	2	3+a	3
PC 4	4·5	5·0	2+a	3+a	3
PC 5	4·2	4·0	2	3+a	3
PC 6	—	—	—	—	—
PC 7	—	—	—	—	—

From these figures it is clear that for all teeth present, the inner row of cusps always contains three and the middle row three plus a small accessory cuspule (a), which might by some authors be regarded as a fourth cusp, depending on the depth of the cleft separating it from the adjacent cusp. The outer row has two cusps on each tooth, with additionally an accessory caspule on PC 2 and PC 4.

The height of the cusps and the degree of crescentic development might be used, if available on sufficient specimens. The extent of wear on many specimens, and in particular on the Holwell specimen rules out use of these characters.

Comparing now the Holwell specimen with the four remaining genera, *Stereognathus* from the Stonesfield Slate is clearly the most dissimilar. *Stereognathus* is unique in the reduction of cusps to 2 2 2; also it is later stratigraphically than any other known tritylodontid. On both these counts it can be regarded as distinct from the Holwell specimen. *Likhoelia*, *Bienotherium* and *Tritylodon* are, in theory if not in practice, distinguishable on their cusp formulae, and none corresponds exactly to that of the Holwell specimen. These three Triassic genera can be interpreted as having a 2 — 3 — 3 cusp formula. None is exactly the same size as the Holwell specimen, though *T. fraasi* is closest.

Thus in assessing the Holwell specimen taxonomically only two

Stratum	Location	Name	Original Reference	Post Canine Teeth Number	Cusp Formation PC^4			Width v Length	Length PC^4
					o	m	i		
MID JURASSIC	Stonesfield Slate, Oxford, England	*Stereognathus ooliticus*	Charlesworth 1854	6?+	2	2	2	W > L	3·3
LOWER JURASSIC	Fissure, Shepton Mallet, Somerset, England	*Oligokyphus major* ,, *minor*	Kühne 1956	7 6	3 3	4 4	3 3	L > W L > W	4·5 3·5
	Fissure, Holwell, Somerset, England	Holwell UB 19046	Savage & Waldman 1966	7	2	3	3	W > L	4·5
	Bone-Bed, Würtemburg, Germany	*Oligokyphus triserialis* *Chaleopotherium plienigeri* *Tritylodon fraasi*	Hennig 1922 Ameghino 1903 Lydekker 1887	? ? ?	3 2 2	4 3 3	3 ? 3	L > W ? W > L	4·2 ? 4·0
UPPER TRIASSIC	Cave Sandstone, Karroo, S. Africa	*Tritylodontoideus maximus*	Fourie 1962	9		?		?	?12
	Red Beds, Karroo, S. Africa	*Tritylodon longaevus* *Likhoelia ellenbergeri*	Owen 1884 Ginsburg 1961	7 7	2 2	3 3	3 3	W > L W > L	7·0 5·5
	Lufeng Fm., Yunnan, China	*Bienotherium yunnanense* ,, *elegans* ,, *magnum* ,, *minor* *Lufengia delicata*	Young 1940 Young 1940 Chow 1962 Young 1947 Chow & Hu 1959	6–7 6–7 6–7 6–7 5	2 2 2 2 2	3 3 3 3 3	3 3 3 3 3	W > L W > L W > L W > L W > L	7·0 5·3 11·0 3·4 2·1

answers seem possible. One is to establish it as a new genus, differentiated from existing genera only on a small difference in the number of cuspules. The alternative is to leave the Holwell specimen without a generic allocation as Tritylodontid *incertae sedis*. The latter alternative is in the circumstances preferable.

I am grateful to Dr. J. A. Hopson for valuable comments on this note. I have in general followed his cusp interpretation, but as his taxonomic revision is unpublished I have left this unaltered.

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A LATE PLEISTOCENE MAMMAL FAUNA FROM CAERWENT QUARRY, MONMOUTHSHIRE

By Stephen Locke
(*Newport Museum, Monmouthshire*)

INTRODUCTION

DURING August 1970 an enquiry at Newport Museum resulted in the author identifying a number of mammalian teeth and bones of late Pleistocene age, from Caerwent Quarry, Monmouthshire. The finder, Mr. Colin Titcombe, was at that time working in the quarry. The best part of the finds have been lent to Newport Museum where some are now on display. The fossils had been collected during the previous five months from a cave or fissure which had been revealed, and then largely destroyed by quarrying. Sufficient evidence remained however to justify a brief account of the geological context of the fauna in addition to compiling a faunal list.

Caerwent quarry is working in Carboniferous Limestone of the Drybrook Limestone Formation which has here a general southerly dip of about 5°. (Welch & Trotter, 1961). The cave was exposed in the highest western face of the quarry (grid reference ST 472 895), the top of which lies at about 100 ft. O.D.

THE BONE CAVE

The fossils were found in a cave which has the form of a long, roofed, vertical fissure bearing at 145°. It was 55 m long, about 4 m wide and exceeded 11 m in depth. The north-western end is terminated by a vertical shaft communicating with the surface which was certainly the main entrance, and the only part of the cave still remaining. A shallow sub-circular depression 8·5 m wide marks the communication of the shaft with the surface but in section it is seen to narrow rapidly to 3 m. The following section is revealed in the shaft:—

2. Orange-brown loamy clay streaked with many small patches of black sooty material and a few larger patches of wet yellow clay towards the base. Small quartz pebbles and fragments of limestone are thinly scattered throughout this deposit which shows slight signs of stratification.
   filling shaft to .. .. 4·5 m

1. Breccia. Angular fragments of Carboniferous Limestone of varying sizes (commonly between 100 and 200 mm) generally much weathered with a decalcified skin; broken fragments of banded tuffaceous stalagmite; thinly scattered bones, often friable; set in a matrix of mottled red to dark brown sandy clay with black and yellow patches as in bed 1. No visible stratification.
seen to .. .. 5 m
Talus slope to floor of quarry

The lowest levels of the breccia are stated by Mr. Titcombe to have contained fewer but larger blocks of limestone in a matrix of brown sandy clay; some of these boulders still remain on the quarry floor and attain sizes of 2 or 3 m. They appear waterworn and are probably contemporary with the original enlargement of a minor fault to form the cave. The bone-bearing breccia occurred at higher levels in the front half of the cave and contained angular limestone fragments throughout, which varied in size up to 0·5 m. This is interpreted as a frost breccia with a variable matrix introduced by periodic flooding; tuffaceous stalagmite formed intermittently and was subsequently broken and incorporated in the breccia.

THE FAUNA

A good range of species is represented by only a few specimens of each; teeth are common, sometimes only the crowns are preserved, but some mandibles and other bones also occur. Although no actual traces of gnawing have been detected, the very fragmentary nature of the bones, together with the presence of juvenile mammoth and deer, suggest that this fauna was largely carrion accumulated by hyaena.

HYAENA *Crocuta crocuta* Erxleben
at least three adults and a juvenile are represented by several mandibles, a number of teeth and coprolites.

LION *Felis leo* Linné

BADGER *Meles meles* Linné

BROWN BEAR *Ursus arctos* Linné
these species represented by a small number of teeth, and in the case of the Badger, mandibles.

MAMMOTH *Mammuthus primigenius* (Blumenbach)
one juvenile is represented by four teeth.

WILD PIG *Sus scrofa* Linné

GIANT DEER *Megaloceros giganteus* (Blumenbach)

REINDEER *Rangifer tarandus* (Linné)
Deer are mainly represented by a few mandible fragments and a number of teeth, many of which are very juvenile.

BOS/BISON Ox or Bison

BANK VOLE *Clethrionomys glareolus* (Schreber)

VOLE *Microtus* sp.

FIELD MOUSE *Apodemus sylvaticus* (Linné)
Rodents are represented by several mandibles and loose teeth.

COMPARISON WITH OTHER SITES

Late Pleistocene deposits with stratigraphic control are known from the Wye Valley (King Arthur's Cave: Hewer 1926, Taylor 1928) and Mendip (Cheddar Caves: Donovan 1955; Brean Down: ApSimon, Donovan & Taylor 1961). Many smaller caves, fissures and shelters are known for which Donovan (1954) provides a complete bibliography and Savage (1969) a stratigraphical summary.

On Mendip, a late Pleistocene cold fauna which included mammoth, rhinoceros, cave-lion, hyaena and bison was followed by a dry-cold final Pleistocene fauna marked by the absence of these animals but the persistence of reindeer, giant deer, red and roe deer, hare, brown bear and fox. Rodents, including lemmings and pika, are generally important members of this fauna. The earlier period is identified as "proto-Solutrian" in terms of human culture, the later as Cheddarian.

The Wye Valley caves fit into this broad scheme. The lower levels of King Arthur's Cave (i.e. the Red and Yellow Clays and Silts, the "Mammoth layer" and the Cave Earths) are late Pleistocene and the succeeding Yellow Rubble with its numerous rodents is final Pleistocene. The lowest levels of the nearby Merlin's cave (Hewer 1926, Phillips 1931, Hinton 1924) are final Pleistocene.

Occurrences of late Pleistocene faunas are restricted on Mendip, but the Caerwent fauna is comparable to that from layer 3 of Picken's Hole (Tratman 1964). The Almondsbury fissure (Savage 1969) contains a somewhat similar fauna as do the Cave Earths and equivalent deposits in King Arthur's Cave.

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HON. AUDITOR:
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HON. SECRETARY:
Miss A. HECKELS, B.Sc.

HON. CIRCULATION SECRETARIES:
Mr. C. S. CARLILE and Mr. J. G. PRINCE

HON. BULLETIN SECRETARY: D. W. B. FROST

CHAIRMAN, FIELD COMMITTEE: H. G. HOCKEY

HON. SECRETARY, FIELD COMMITTEE:
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HON. ASSISTANT LIBRARIAN: Mrs. M. J. ROGERS, M.A.

HON. EDITOR: J. W. COWIE, B.Sc., Ph.D., F.G.S.

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Mrs. A. J. HOLLOWELL, M.A., A.M.A.

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Hon. Secretary—Miss I. F. GRAVESTOCK, B.A.

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President and Hon. Secretary—T. B. SILCOCKS, F.C.A.

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President—D. HAMILTON, B.A., M.Sc.
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E. S. SMITH
R. G. SYMES, B.Sc.
G. SWEET

Ex-officio the Professors of
BOTANY, GEOLOGY and ZOOLOGY at the UNIVERSITY OF BRISTOL

REPORT OF COUNCIL, 1971

THE membership now stands at 790 including 71 juniors. There are 10 affiliated societies. The Annual General Meeting re-elected S. M. Taylor as President and elected the other Officers and Members of Council. The Annual Dinner was held in the Senior Common Room of the University, after which our Guest Speaker, Mr. D. Browning, gave an illustrated talk on "Field and Hedgerow".

The Conservation Committee under the chairmanship of Mr. K. Batty continues its good work. The Nature Trail at Ashton Park was opened on 24th April. As a result of representation to the Nature Conservancy two areas, Cook's Folly Woodland and Windsor Hill Marsh, have been given the status of a S.S.S.I. The committee has protested to the County Authority against dumping at Nailsea Moor and Kenn Moor. A Natural History Survey of the area bordering the Avon in Sneyd Park has been completed and a report handed to the City Planning Officer. A survey of the Avon Valley from Bristol to Bath has commenced.

At a meeting in December, 1971 the Library Committee decided to recommend to Council for discussion at their February meeting that:—

(1) Negotiations should proceed with the University at an opportune time for the sale of the Bulletin of the American Museum of Natural History (Council have already authorised the sale).
(2) Attempts be made to sell, at a good price, the Palaeontographical Society memoirs.
(3) Runs of European periodicals, little or never used, should be sold.
(4) The exchange list should be pruned.
(5) Money from these sales should be used to purchase books of general interest to members.

Informal talks have begun with local Natural History Trusts concerning possible implications of impending local government boundary changes.

We regret we have to report the deaths of Mr. F. B. Evans, Dr. D. Munro Smith, Mr. C. B. Salter and Miss A. K. Swaine.

AUDREY HECKELS, *Hon. Secretary.*

LIBRARIAN'S REPORT, 1971

THE proposal to build a new City Museum has been abandoned and the hopes of the Society that at last its library would be adequately housed have been dashed. In the foreseeable future therefore we must make do with the present room and take steps to see that it is used to maximum advantage.

To add to our problems the University library has given us notice that because of their own space problems all our foreign journals at present in the library in Queen's Building must be removed within two to three years.

The Library Committee is investigating ways of reducing the size of the library by selling runs of periodicals which are little, or never, used. The proceeds of such sales will be devoted to the purchase of a wider range of books on natural history than has been possible hitherto.

We are grateful to the Director of the City Museum and the Librarian of Queen's Building, University of Bristol for providing accommodation over the years and for their continued help.

ACCESSIONS TO THE LIBRARY, 1971

Macfadyen, W. A.	Highlights of the Geology of the West Country.
Simms, E.	Woodland Birds.
Rowbotham, F. W.	The Severn Bore.
Findlay, W. P. K.	Wayside and Woodland Fungi.
McMillan, N. F.	British Shells.
Ragge, D. R.	Grasshoppers, Crickets and Cockroaches of the British Isles.

R. BRADSHAW, *Hon. Librarian.*

The Hon. Treasurer in Account with the Bristol Naturalists' Society

ACCOUNTS FOR THE YEAR ENDED 31 DECEMBER, 1971

Dr.

1970 £		£ p	£ p
	Members' Subscriptions:		
804	Full Members	804·25	
77	Full Members of the same household	77·01	
20	Corresponding Members	22·25	
9	Associates	12·00	
35	Juniors	33·00	
26	Affiliated Societies	24·50	
971			973·01
3	Donations		4·25
96	*Proceedings*		
	Grants	64·50	
	Offprints	34·70	
	Sales	38·74	
1,070			137·94
16	Field Committee: profit		5·04
8	Sale of Badges		2·60
	Profit on dinner		3·00
36	1970 Film Show: profit		—
1	Interest from National Savings Bank		0·87
26	Interest on Bonds		25·00
7	Members contributions to The Harry Savory Illustrations Fund		5·00
582	Balance from last account		573·91
£1,746			£1,730·62

Cr.

1970 £		£ p	£ p
219	General Printing and Stationery	194·78	
146	Postages and telephone	177·57	
1	Cheque books	—	
12	Clerical assistance	12·00	
378			384·35
642	*Proceedings* (1970, including offprints)		608·15
13	Books	5·50	
38	Subscriptions for journals, etc.	46·05	
	Rent (of library room)	0·05	
4	Fire Insurance (library)	7·90	
			59·50
6	Contributions to Council for Nature, etc.		6·25
6	Fares and expenses of general meetings		6·00
85	Grants to Sections:		
	Botanical	10·00	
	Entomological	5·00	
	Geological	10·00	
	Mammal	15·00	
	Ornithological	30·00	
	Junior	10·00	
1,172			80·00
	Balances to next account:		
63	Cash in bank	69·67	
36	Deposit in National Savings Bank	36·58	
200	*£200 5½% National Development Bonds	200·00	
200	£200 7% British Savings Bonds	200·00	
75	In hands of Field Committee	80·12	
			586·37
£1,746			£1,730·62

*Including the Harry Savory Illustrations Fund £55·13

Note: These accounts do not record balances held by sectional treasurers and the Ornithological Section Special Fund of £75·96

P. J. M. NETHERCOTT, *Hon. Treasurer*,
13th January 1972.

Audited and found correct, A. E. BILLETT, *Hon. Auditor*,
18th January, 1972

REPORT OF ENTOMOLOGICAL SECTION, 1971

AT the Annual General Meeting on 5 January the following were elected: President and Secretary, T. B. Silcocks; Committee: Mrs. R. E. Knight, P. F. Bird, J. F. Burton, A. N. Grose. The following meetings were held. Leaders of field excursions are given in parentheses.

Mar. 2: Films "Butterflies at home" and "Four Seasons" by Mr. D. Whatley.
May 2: Barnsley Warren (Mr. J. Muggleton).
June 5: Charterhouse (Mr. T. B. Silcocks).
June 27: Avebury and Marlborough Downs (Joint with Junior Section).
July 17: Forest of Dean (Mr. A. N. Grose).
August 7: Midger Wood (Mr. and Mrs. R. E. Knight).
October 5: "Looking Forward," illustrated talk by Mr. P. F. Alfrey.
Nov. 2: Annual Exhibition at the City Museum. This included the Fullock Collection of Malaysian butterflies.

T. B. SILCOCKS, *Hon. Secretary.*

REPORT OF BOTANICAL SECTION, 1971

AT the Annual General Meeting in the Botany Department Herbarium on 25th January, 1971, the following officers were elected: President: Dr. A. F. Devonshire; Secretary and Treasurer: Miss I. F. Gravestock; Committee: Dr. T. E. T. Bond, Dr. D. H. Brown, Mrs. C. H. Cummins, Mrs. N. Vaughan Davies, Mr. C. H. Hurfurt, Mr. P. J. M. Nethercott, Dr. D. H. Peregrine and Dr. C. E. D. Smith.

The wild plant table at the Museum continued to be much appreciated, and thanks are offered to Mr. N. Thomas and Mr. P. F. Bird of the Museum and to Mr. E. S. Smith, as well as to the members and others who helped during Mr. Smith's illness.

The following winter meetings were held during the year:—

Jan. 25:	Annual General Meeting and a Further Progress Report on the Somerset Flora by Capt. R. G. B. Roe; also Members' Evening.
Feb. 22:	Symposium on Upper Teesdale, by Dr. L. C. Frost, Mr. John Muggleton and Miss I. F. Gravestock.
Mar. 15:	Pollination—Some Mechanisms and Consequences, by Dr. M. C. F. Proctor, M.A., Ph.D., A.R.P.S.
Oct. 25:	Members' Evening, with transparencies.
Nov. 22:	The Flowers of South Africa, by Mrs. N. Vaughan Davies.

The following field excursions took place, under the leadership of those shown:—

Mar. 27:	Leigh Woods, for Bryophytes. Mrs. J. A. Appleyard.
April 24:	From alluvium to limestone; Mouth of Axe to Purn Hill. Miss G. E. Middleton.
May 22:	Charterhouse and Velvet Bottom. Dr. D. H. Brown.
June 12:	Kenfig Burrows. Mr. P. J. M. Nethercott. This area still supports a rich flora. *Liparis loeselii* was seen, and many excellent specimens of *Pyrola rotundifolia*.
June 29:	The Heart of Bristol. Dr. A. F. Devonshire.
July 3:	Goblin Combe. Miss V. Graham.
July 31:	Clevedon to Redcliffe Bay. Mr. C. H. Cummings. *Althaea officinalis* found on the beach near Redcliffe Bay.
Sept. 4:	Bickley and Hencliff Woods, Hanham. Mr. C. H. Hurfurt.
Sept. 11:	Fungus Foray to Wetmoor. Dr. C. E. D. Smith.

I. F. GRAVESTOCK, *Hon. Secretary.*

REPORT OF GEOLOGICAL SECTION, 1971

THE Annual Business Meeting of the Section was held on 7th January, 1971 in the Geology Lecture Theatre of the University. The following officers were elected: President, Mr. A. E. Frey; Vice President, Mr. D. Hamilton; Hon. Secretary, Dr. A. B. Hawkins; Hon. Field Secretary, Mr. D. Hamilton; Committee, Professor D. L. Dineley, Student President of the University Geological Society (both *ex-officio*), Miss Garland, Mrs. Hamilton, Mr. Harrison, Mr. Hollingsworth and Mr. Leese.

After the Meeting, the retiring President, Mr. D. Hamilton, gave a lecture entitled 'Deeps and Canyons of the Western Approaches'. Other lecture meetings were:—

17 February: Geological Problems in a Developing Country.
Dr. R. J. G. Savage.
18 March: Limestones in the Making.
Dr. J. W. Murray.
21 October: Mendips: An exhumed landscape.
Mr. A. E. Frey.
18 November: Origin and Early Evolution of Life.
Dr. J. W. Cowie.

The following three field meetings took place:

27 June: Swanage.
Leaders, Mr. C. A. Wright, Dr. J. W. Murray.
18 July: The Vale of Wardour.
Leaders, Mr. C. A. Wright, Mr. A. N. Insole.
25–26 September: The Gower Coast.
Leader, Dr. B. P. J. Williams.

A. B. HAWKINS, *Hon. Secretary.*

REPORT OF ORNITHOLOGICAL SECTION, 1971

"THE WREN
THE WREN
THE KING OF
ALL BIRDS
PS

AT the 47th Annual General Meeting, Messrs. P. J. Chadwick and H. R. H. Lance were re-elected President and Secretary respectively. Mr. S. M. Taylor was re-elected as Assistant Secretary. Miss R. C. Lee, Mr. M. A. Ogilvie and Mr. R. Pople were elected to the Committee, while Messrs. W. G. Bigger, R. Bland, D. Lucas, J. D. R. Vernon and D. Warden were re-elected. Mr. A. E. Billett was re-appointed Hon. Auditor.

Eight Indoor Meetings were held with an average attendance of 73. The subjects and speakers were:—

Jan. 20: Birds of Greece by Mr. P. J. Chadwick.
Feb. 5: Bird Painting by Mr. E. Penny.
Feb. 19: Birds of East Africa and nearby Islands by Dr. M. E. Gillham.
Mar. 19: Rings for Research by Mr. C. J. Mead.
Oct. 1: Water Identification by Mr. S. M. Taylor, Mr. H. R. Hammacott and Mr. W. G. Bigger.
Oct. 20: Alaska by Mr. B. Sage.
Nov. 19: Two colour films "The Penguin Millionaire" and "The Flying Doctor of Jamaica" by Mr. L. Hill.
Dec. 10: More Birds of Prey by Mr. P. J. Hayman.

Eleven Field Meetings were organized as follows:—Bury inlet, Glamorgan (Feb. 21st). The Severn Shore and The Wildfowl Trust (Feb. 28th). Brean Down and Axe Estuary (May 2nd). Hanham (May 4th). Leigh Woods (May 14th). St. George's Wharf (May 24th). Shepton Mallet (June 5th). Didmarton and Tormarton (June 16th). Brean Down and Axe Estuary (Sept. 12th). Clevedon Sea

Walls (Oct. 10th). Caldicot Marsh, River Severn and adjoining habitats (Nov. 7).

We thank the leaders and helpers on these occasions, and also those members who gave hospitality to visiting speakers and helped in other ways.

Members contributed to the following B.T.O. field projects:—The Nest record and Ringing schemes, The Common Bird Census, the Birds of Estuaries Survey, The Atlas of Breeding Distribution; and to our own projects on The Birds of Bristol, Starling roosts, Birds of Prey, Gulls of the River Avon, Shelduck Survey, Collared Dove Survey, House Martin Survey, and Rookeries in S. Gloucester. More members, skilled or unskilled, would be most welcome to join in any of these activities.

H. R. H. LANCE, *Hon. Secretary.*

REPORT OF MAMMAL SECTION, 1971

AT the Annual General Meeting on 12th January, 1971 the following officers were re-elected: President, Mr. A. F. Jayne; Secretary, Miss E. J. Lenton; Recorder Mr. R. G. Symes; Conservation Committee Representative, Mr. A. F. Jayne; Committee Members, Messrs. R. M. Curber, F. H. Rawlings and G. Walker. Mr. R. G. Symes was elected Library Committee representative and Miss J. Webb elected Committee member.

Six indoor meetings were held, with an average attendance of 56:—

Jan. 12: A.G.M. and members' slides and talks.
Feb. 9: British Deer, by Mr. S. Harris.
Mar. 9: Weasels, by Miss C. King.
Oct. 29: The Spotted Hyaena, Past and Present, by Dr. A. J. Sutcliffe.
Nov. 26: Mammals of the New Forest, by Mr. O. Hook.
Dec. 17: Mammal Workshop; an evening of activities and exhibits to encourage member participation.

Field meetings were as follows:—

Feb. 7: Fox Spotting. Mr. F. H. Rawlings.
Feb. 21: Badger Survey. Mr. F. H. Rawlings.
Mar. 21: Rowberrow Warren. Miss E. J. Lenton.
Apr. 4: Ashton Court Nature Trail. Mr. F. H. Rawlings.
Apr. 16, 23 30. May 7, 14: Badger Watches. Mr. A. F. Jayne.
May 15–16: River Surveys in Devon. Miss L. E. Hurrell.
June 19–20: Glan-yr-Afon. Messrs. A. F. Jayne and R. H. Symes.
July 18: River Survey—the Frome. Mr. G. Moysey.
Aug. 29: Spaniorum Hill. Mr. A. F. Jayne.
Sep. 5: Woodchester Park—horseshoe bats. Mr. R. Ransome.
Sep. 24–26: Pembrokeshire—grey seals. Miss E. J. Lenton.
Oct. 9: Woburn Deer Park. Mr. D. Talbot.
Nov. 14: River Surveys—Axe, Huntspill and Brue. Miss J. Webb.
Dec. 12: Leigh Woods. Messrs. R. M. Curber and G. Walker.

E. J. LENTON, *Hon. Secretary.*

ACCOUNT OF GENERAL MEETINGS, 1971

THERE have been good attendances at all the General Meetings. The Annual General Meeting was held on 21st January. The Officers and Members of Council were elected. Mrs. F. R. Sterne, the retiring Secretary, had served for seven years in that office. The President, Mr. S. M. Taylor gave an address on "Reflections on a Witch-hunt" outlining the history of Witchcraft from pre-history to the present time.

On 14th January Mrs. D. G. Hill-Cottingham, who had spent a year in New Zealand, spoke on "A Naturalist in New Zealand". This meeting had originally been planned for November, 1970 but was postponed because of the "work-to-rule" at the University.

On 4th February, Mr. K. S. Brown spoke on "The Recreational use of water in the U.S.A." This provoked a lively discussion on the facilities available at Chew Valley Lake.

On 4th March, Mr. E. B. Cowell spoke on "Marine Pollution". He discussed the effect of man-made pesticides on mammals and birds and the eventual effect on man himself.

On 14th October, Mrs. Angela Hughes spoke on "A farmer and conservation". Mrs. Hughes is an active conservationist as well as a farmer and her Blackmore Vale Farm is run accordingly.

On 4th November, Professor Dineley spoke on "The Sabrina Project"—an inter-disciplinary study of scientific factors within the Severn Estuary and its hinterland.

During a Members' Evening on 2nd December short accounts were given of places, incidents and observations based on their own travels. Contributors included Mr. Hammacott on Lake Neusiedl, Austria; Dr. C. E. D. Smith on Tanzania; Dr. A. F. Devonshire on Savernake Forest; Mrs. D. G. Hill-Cottingham on Panama Canal and Miss A. Heckels on Iceland.

AUDREY HECKELS, *Hon. Secretary.*

GENERAL FIELD MEETINGS, 1971

FIFTEEN field meetings were held during the year and proved generally popular. A list of the meetings with leaders and an indication of the things seen is given below. A fuller account is kept in the records of the Field Committee. In the following list the leader is given first followed by the area visited.

Jan. 17: H. G. Hockey. Penarth; geology Sully Island (accessible at low tide); small birds, waders, gulls. Barry Docks; waders.
Mar. 28: D. A. C. Cullen. Heron's Green; ducks etc. Mendip Hills; remains of mining, swallets, barrows, stone circles, and Roman remains.
April 9: H. G. Hockey. Heddon Valley Nature Trail (N. Devon); birds, plants, and coast scenery.
May 7: B. King. Shapwick; a late evening meeting to see nightjars.
May 10: K. Batty. Ashton Park Nature Trail; trees, plants, birds and deer.
May 13: D. A. C. Cullen. Inglestone Common; plants and birds, including nightingales.
May 20: B. King. Saltford and Burnet; birds and limestone plants.
June 6: Miss R. C. Lee. Bredon Hill; geology, plants, birds, and an Iron Age hill fort.
June 23: Miss R. C. Lee. Long Wood Nature Trail and Velvet Bottom; trees, plants, birds and remains of lead mining.
July 7: H. G. Hockey. Brent Knoll; an Iron Age hill fort with a beacon and extensive views.
July 10: A. F. Devonshire. Castle Neroche Forest Trail; mixed woodland, and the earthworks of a Saxon and Norman castle.
Aug. 14: Miss C. Groves. Prinknash Abbey. An ancient monastery, which is being rebuilt.
Sept. 19: Mrs. D. G. Hill-Cottingham. Charmouth; marine biology, geology and birds.
Oct. 17: Miss R. C. Lee. Durley reservoir; ducks and waders. Crowcombe Park Gate to Hodder's Combe; birds and plants.
Nov. 27: A. F. Devonshire. Caerleon and Caerwent; extensive remains of a Roman legionary fortress, and a Roman civil town.

A. F. DEVONSHIRE, *Hon. Field Secretary.*

BRISTOL BOTANY IN 1971

By A. J. Willis

(Department of Botany, University of Sheffield)

THE year 1971 started with a very wet but relatively mild January and a dry February which was fairly sunny, conditions which resulted in moderately early spring growth. Records made at Long Ashton Research Station show that for the year as a whole, however, temperatures were average, but rainfall was greater than average (total of 957·6 mm., 37·70 inches) and sunshine also was above average. The rainfall was very unevenly distributed, with June, August and October distinctly wet months besides January, while May, July, September and December (as well as February) were much drier than usual. June was dull, cold and extremely wet, with nearly three times the average rainfall (the wettest day of the year was 10 June with 57·1 mm. of rain), but this weather was compensated by a warm, dry and sunny July (there were 14·9 hours of sunshine on 13 July, the sunniest day of the year).

Although no records of any plants completely new to the Bristol district were made in 1971, further localities for a considerable number of species were reported, some as a result of detailed study in connection with the flora of particular grid squares, certain of them in the City of Bristol itself. Among the more notable finds are several showing the continued existence of rare or uncommon plants in localities from which they have been reported many years ago and for which there are no recent authenticated records. Attention may be drawn especially to the welcome discovery of *Herminium monorchis* on Bathford Hill, to the occurrence in an inland locality, near Wells, of *Trifolium squamosum* (perhaps here reflecting the position of a former shore line), to the persistence of *Scirpus cernuus* adjoining the shore near Portishead, and to the occurrence of *Eryngium maritimum* at Uphill. A new station is recorded for the hepatic *Barbilophozia floerkei*, very rare in North Somerset and not known from West Gloucestershire (v.c. 34).

The Dutch Elm disease has been rampant in the district. It has caused considerable damage, apparently to all species of elm, and the widespread destruction was much worse than in 1970. This has had a severe impact, not only on the rural scene but also on the urban scene, as several trees on Durdham Down have been felled.

Of interest is the full account of the history of the drainage of the

Somerset Levels given by M. Williams in his book, published in 1970, entitled *The Draining of the Somerset Levels* (Cambridge University Press). Unfortunately only very little reference is made to vegetation, but drainage activities, probably dating first from the late twelfth century and subsequently involving extensive work and reclamation, are fully documented, and an appraisal is given of present trends and prospects.

With the death of Dr. D. Munro Smith on 1 December 1971, following a fall in the Avon Gorge where he was looking for mosses, the district has lost a keen plant hunter who was active in the Bristol area for many years. Most of the records which he made were from around Frenchay and Stapleton, but, after his fairly recent move to Bristol itself, he turned his attention to the Avon Gorge. Dr. Munro Smith was especially interested in bryophytes and in 1963 he found an unusual moss in Oldbury Park, Bristol. This subsequently proved to be *Pohlia lutescens* (Limpr.) Lindb.f., new to Britain, and is the subject of a paper by Dr. E. V. Watson in the *Transactions of the British Bryological Society* (Vol. 5, pp.443–7, 1968).

Names of contributors associated with several records are abbreviated thus:

J.A., Mrs. J. Appleyard	E.J.L., Miss E. J. Lenton
J.F.B., J. F. Burton	L.F.H.M., L. F. H. Merton
C.H.C., C. H. Cummins	P.J.M.N., P. J. M. Nethercott
A.F.D., Dr. A. F. Devonshire	R.G.B.R., Capt. R. G. B. Roe, R.N.
I.F.G., Miss I. F. Gravestock	M.A.S., Mrs. M. A. Silcocks
S.C.H., Mrs. S. C. Holland	D.M.S., Dr. D. Munro Smith

G: Gloucestershire **S**: Somerset

Polystichum setiferum (Forsk.) Woynar. Many plants on the borders of wood, Woodhill ridge, Portishead, **S.**, *I.F.G.*

Aquilegia vulgaris L. Compton Combe, near Compton Martin, another locality for this plant on the Mendip limestone, **S.**, *J.A.*

Silene dioica (L.) Clairv. The rare form with white flowers, in a small wood near Litton, **S.**, *J.A.*

S. alba (Mill.) E. H. L. Krause × *S. dioica* (L.) Clairv. A hybrid swarm, sand dunes, Berrow, **S.**, *L.F.H.M.*

Stellaria holostea L. var. *laciniata* Bromf. Hedge near Theale, **S.**, *J.A.* A first record for this form with laciniate petals south of Mendip and the third for the Bristol district.

Malva moschata L. var. *heterophylla* Lej. With white flowers, Knapp Hill, Wells, **S.**, *I.F.G.*, conf. *R.G.B.R.* This variety is also reported from Sandford Hill, near Winscombe, **S.**, *I.F.G.* and *M.A.S.*

Lavatera arborea L. Large clump, an escape from cultivation, Failand, **S.**, *J.F.B.*

Geranium columbinum L. With *G. rotundifolium* L., Goblin Combe, Cleeve, **S.**, and also on Sandford Hill, near Winscombe, **S.**, *I.F.G.*

G. robertianum L. The form with pure white flowers, on wall, Everard's Farm, near Chewton Mendip, **S.**, *J.A.* Previous records exist for several other Mendip localities.

Ulex gallii Planch. Encroaching heavily on down land, Crook Peak, **S.**, *I.F.G.*

Medicago falcata L. Several erect plants by road near to the new Brislington Bridge, Bristol, **S.**, *A.F.D.*

Trifolium squamosum L. Many patches in Yarley Field Lane, south of Henton, near Wells, **S.**, *J.A.* This locality agrees with that given by Murray in *J. Bot.* 1882, p. 328, and in his *Flora of Somerset* 1896, but the place where Miss Livett formerly knew the plant at "the old lane on the top of Yarley Hill" which was "taken into the bordering field and ploughed up" (see White *Flora*, p. 235) appears to be different. The reprint of the first edition of the one-inch O.S. map shows a lane from Henton over the hill to the road along the north of Ash Moor, and *T. squamosum* grows in the only remaining section of this lane, now an overgrown footpath (a new road runs further west over the hill from Henton, and the section to Ash Moor has disappeared). The Sea Clover is also present in fair quantity in a slack grading from saline to nearly freshwater at Berrow, **S.**, *L.F.H.M.;* this plant was earlier reported from the strand zone at Berrow (H. S. Thompson, *Rep. Bot. Sect. Som. Arch. and Nat. Hist. Soc.* 1933).

Hippocrepis comosa L. Locally common on steep slopes of Church Hill and Wain's Hill, Clevedon, **S.**, *J.F.B.*

Sorbus torminalis (L.) Crantz. One tree on Sandford Hill, near Winscombe, **S.**, *I.F.G.*, who, with *M.A.S.*, also reports *Blackstonia perfoliata* (L.) Huds., *Iris foetidissima* L., *Platanthera chlorantha* (Custer) Reichb. and *Epipactis helleborine* (L.) Crantz from this locality.

Lythrum hyssopifolia L. In garden, Wraxall, **S.**, *H. Kay.* Also present was a lilac form of *Anagallis arvensis* L.

Eryngium maritimum L. A small plant on the sands at Uphill, **S.**, *T. B. Silcocks.* Reported from this locality by St. Brody (White *Flora*, p. 329), but noted by White (*loc. cit.*) as "not there now". There is a record, however, of "several plants still at Uphill" for 1922 (Sandwith, ms.), and the present report is of interest in respect of the continued, if sporadic, existence of this plant at this station.

Foeniculum vulgare Mill. In lane, Abbots Leigh, **S.**, *C.H.C.*

Euphorbia lathyrus L. Several plants in shady hedgerow, Brockley Combe, **S.**, *J.F.B.*

Gentianella amarella (L.) Börner. Crook Peak, **S.**, *I.F.G.*

Atropa bella-donna L. With *Senecio squalidus* L. and *Lysimachia punctata* L. on waste ground, Vicarage Road, Leigh Woods, **S.**, *C.H.C.*

Verbascum thapsus L. On waste ground, Dundry Down, **S.**, *A.F.D.*

Lathraea squamaria L. It was reported in the article by A. J. Willis and D. Gledhill on 'A Herbarium Book of Dr. Arthur Broughton' (these *Proc.* for 1970, p. 56) that there were no recent records of this plant from St. Vincent's Rocks. However, Miss I. F. Gravestock notes that some ten years ago *L. squamaria* was growing very near to the brickwork of the Bristol end of the Clifton Suspension Bridge, on the city side. The plant is also known (*P.J.M.N.*, see *Bristol Botany in 1967*) on undisturbed ground in the Sneyd Park region, but is very restricted on the Gloucestershire side of the Gorge, whereas it occurs in plenty in Leigh Woods on the Somerset side.

Orobanche minor Sm. About a dozen plants in trough, Canynge Road, Clifton, Bristol, **G.**, *A.F.D.*

Campanula trachelium L. At hedge border, Durdham Down, Bristol, **G.**: also on Sandford Hill, near Winscombe, **S.**, *I.F.G.*

Rubia peregrina L. Colonizing rock face on main road, Winscombe, **S.**, *I.F.G.*

Dipsacus pilosus L. A further locality by the River Chew, north of Shrowl Bridge, near West Harptree, **S.**, *J.A.;* also abundant along the banks of the River Frome (on the Somerset side) opposite Pomeroy Wood, near Tellisford, **S.**, *E.J.L.*

Senecio vulgaris L. var. *radiatus* Koch. Chittening Warth, north of Hallen, **G.**, *I.F.G.*

Cirsium eriophorum (L.) Scop. Common, with *Cardus nutans* L., on rough hillside pasture above Brockley Combe, **S.**, *J.F.B.*

Onopordum acanthium L. Roadside, south end of Chew Stoke, **S.**, *J.A.* The Scotch or Cotton Thistle is rare in inland parts of the Bristol district.

Cichorium intybus L. With *Althaea rosea* L., *Carduus nutans* L. and *Linaria purpurea* (L.) Mill., on derelict area between Weare St. and Mead St., Bristol, **S.**, *A.F.D.*

Allium oleraceum L. The report of the plant on Durdham Down made last year (*Bristol Botany in 1970*, p. 18) needs correction; this plant is not the variety *complanatum* (Bor.) Fries. Mr. W. T. Stearn, to whom the late Dr. D. Munro Smith sent specimens, notes (*in litt.*) that the plant lacks the rosy flowers attributed to Regel's *β roseum* (the same as var. *complanatum* of Fries), and considers that it is a robust form which belongs to Regel's *A. oleraceum α virens*. Further nearby localities for *A. oleraceum* are Clifton Down near the Suspension Bridge, **G.**, *S. Harris*, and St. Vincent's Rocks, **G.**, *Mrs. E. Hodgson* (1956).

Spiranthes spiralis (L.) Chevall. On the northern side of Pipley Bottom, near Upton Cheyney, close to the county boundary, **G.**, *E.J.L.*

Herminium monorchis (L.) R. Br. Two patches on Bathford Hill, **S.**, *Timothy Gaynor* and *Mrs. P. Gaynor*, conf. *R.G.B.R.* The Musk Orchid is very rare in the Bristol district. White (*Flora*, p.565) refers to old records from "hill pastures near Bath", but the only fairly recent record for this area was made by Miss A. E. White on the Combe Down side of Bath in 1938 and 1939 (*Bristol Botany in 1939*).

Ophrys muscifera Huds. Six plants with aberrant flower structure, similar to those described in *Bristol Botany in 1968* and in the same locality, Leigh Woods, Bristol, **S.**, *S. Harris.*

Scirpus cernuus Vahl. Near Portishead, near the shore path between Portishead and Clevedon, **S.**, *P.J.M.N.*, who notes the variable length of the bracts subtending the inflorescences, but the smooth, very fine slight netted surface of the nuts. The report of this rarity is of considerable interest in relation to a manuscript record of 1918 by Miss I. M. Roper of the var. *microstachys* Hook. f. (with a solitary spikelet and no long bract) from a spring-head, Charlcombe Bay.

Poa nemoralis L. Grassy verge, Middle Ellick Farm, top of Burrington Combe, **S.**, *J.A.*

Bromus ferronii Mabille. In his Biological Flora account of *Helianthemum apenninum* (L.) Mill., in *J. Ecol.*, Vol. 44 (1956), *Dr. M. C. F. Proctor* lists *Bromus* cf. *ferronii* (Table 8, facing p. 690) from Brean Down, **S.** *T. C. E. Wells* reports *B. ferronii* (conf. *Dr. A. Melderis*) from Brean Down in 1968. However, search of the small Bromes on Brean Down and at Uphill by *P.J.M.N.* in June 1970 showed only plants referable to *B. thominii* Hardouin. *Dr. C. E. Hubbard* reports that these plants are "not the coastal cliff-top grass (*B. ferronii*) of S.W. and W. England and S.W. Europe which has stiffly erect peduncles, dense rigidly erect panicles, and spikelets with longer and more shaggy, more or less appressed hairs, which are closer together". The lemmas range from 6–8 mm. long in the present plants, similar to *B. ferronii* (7–8 mm.), but the hairs on the lemmas are very short and stiffly spreading. Dr. Hubbard notes that the Brean Down and Uphill plants, which he places tentatively under *B. nanus* Weigel (*B. thominii* Hardouin, var.), are much alike and distinct from most other forms which he has seen. Further study of these grasses in the field and in the experimental garden is needed.

Calamagrostis epigejos (L.) Roth. In 1970, one clump, Westridge Wood, Wotton-under-Edge, **G.**, *Lady A. T. Ricketts* (comm. *S.C.H.*, reported in Vol. 21, No. 8, p. 236 of the Journal of the North Gloucestershire Naturalists' Society).

ALIENS. Erucastrum gallicum (Willd.) O.E. Schulz. One plant on railway bank, Whitby Road, Bristol, **S.**, *A.F.D.*

Erysimum cheiranthoides L. Rownham Hill and also in field near Leigh Woods, Bristol, **S.**, *C.H.C.*

Sisymbrium altissimum L. Two plants, with *Saponaria officinalis* L., near railway on waste ground, south central part of Bristol, **S.**, *A.F.D.*

Chenopodium bonus-henricus L. Latcham Drove, near Wedmore, **S.**, *J.A.*

Impatiens parviflora DC. On waste ground, Kentshire Farm, Winford, **S.**, *J.A.*

Galega officinalis L. A large clump, in 1969, naturalized on side of railway line near disused Wickwar Station, **G.**, *Mrs. D. S. Dudley-Smith* and *S.C.H.*

Potentilla recta L. A single plant on rough ground above the river, Hanham, **G.**, *C. M. Hurfurt*, det. and comm. *P.J.M.N.*

Cotoneaster horizontalis Decne. Knapp Hill rocks, Wells, **S.**, *I.F.G.*

Bupleurum lancifolium Hornem. Among garden weeds, Abbots Leigh, **S.**, *M.A.S.*, det. *Dr. T. E. T. Bond.* There is a manuscript record by Miss I. M. Roper for Abbots Leigh dated 1917.

Euphorbia uralensis Fisch. ex Link. A number of plants on rather marshy ground between Nover's Lane and Lanshill Avenue, south Bristol, **S.**, *A.F.D.*

Alnus incana (L.) Moench. By rhine, Totney Drove, near Mudgley, south of Wedmore, **S.**, *J.A.*, conf. *R.G.B.R.*

Trachystemon orientalis (L.) G. Don. Increasing as ground cover, Cook's Folly Wood, Avon Gorge, **G.**, *I.F.G.*

Veronica filiformis Sm. Large patch on cliff-top, Church Hill, Clevedon, **S.**, *J.F.B.*

Melissa officinalis L. In hedge at Shoreditch, near Chew Stoke, **S.**, *J.A.*

Inula helenium L. A second, fairly large patch (see *Bristol Botany in 1969*) in rough pasture to the south-west of Burledge Hill, near Bishop Sutton, **S.**, *E.J.L.*

Anaphalis margaritacea (L.) Benth. On Leigh Court side of Paradise Bottom, Leigh Woods, **S.**, *C.H.C.*

Juncus tenuis Willd. Near the shore of Blagdon Lake, **S.**, *J.A.*

BRYOPHYTES. Barbilophozia floerkei (Web. & Mohr) Loeske. On gritstone rocks, Wurt Pit, south of East Harptree, **S.**, *J.A.* This hepatic is very rare in North Somerset and has been recorded previously only from the peat moors where it has not been seen recently.

Barbula spadicea (Mitt.) Braithw. Rocky broken ground, Durdham Down, Bristol, **G.**, leg. *D.M.S.*, det. *F. A. Sowter*, conf. *J.A.*

B. vinealis Brid. Rocky hollow, Durdham Down, Bristol, **G.**, *D.M.S.*, conf. *F. A. Sowter* and *J.A.*

Bartramia pomiformis Hedw. Wurt Pit, south of East Harptree, **S.**, *J.A.* This moss is rare in North Somerset.

Cratoneuron filicinum (Hedw.) Spruce var. *fallax* (Brid.) Roth. Downend, Bristol, **G.**, *D.M.S.*

I am indebted to all those who have supplied records and helped with these, especially Mrs. J. Appleyard, Miss I. F. Gravestock, Mrs. S. C. Holland, Mr. P. J. M. Nethercott, and Captain R. G. B. Roe; and to Mrs. C. H. Perry of Long Ashton Research Station for the supply of meteorological data.

BRISTOL BIRD REPORT, 1971

COMPILED BY THE EDITORIAL COMMITTEE OF THE
B.N.S. ORNITHOLOGICAL SECTION

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The Year. 1971 can be summed up as a year of contrasts and of new weather records. January was the wettest since local records began, with almost twice the normal rainfall. The first few days were cold, like the last week of 1970, but then the mild weather that had characterized the previous autumn returned. No large-scale Lapwing movements were observed. A flock of 2,200 Wigeon at the New Grounds on the 6th was the only considerable count for the district in 1971. Gale force winds accompanied heavy rain, notably from the 17th–23rd. During this period, the White-fronted Goose flock at the New Grounds reached its peak of 6,000—well short of the previous winter's record—and at the same time substantial numbers of Bewick's Swans moved away. Some of these may have moved to the Central Somerset levels, where numbers correspondingly increased; but records of colour-marked birds showed that some moved eastwards early, and had reached the R. Elbe by the end of the month—no doubt a result of the mild weather. On the 18th, eight Short-eared Owls were seen together on a stretch of the New Grounds sea wall; they stayed for over two months before gradually dispersing. Several others were seen at Chittening and Sand Bay during February, so that this was an exceptional winter for the species.

February was generally dry and mild, and most of the month's rain fell between the 12th and 16th, turning to sleet and snow on the latter date. On the 19th a Mistle Thrush was nesting at Snuff Mills, Stapleton. Reports of wintering Blackcaps included several trapped and ringed in suburban gardens.

March was unsettled, with winds mostly from the east. The first week was very cold, with a little snow; the second was drier, though still rather cold. The third week was wet, with easterly gales at times, and the fourth was again cold and dry. The first summer migrant to be reported locally was a Chiffchaff at Blagdon reservoir on the 7th. A few others followed at reservoirs and coast between the 14th and 24th, and reports were widespread by the 31st. However, most of the first summer migrants were late; a Ring Ouzel at Sand Point on the 17th and two at Brean Down on the 28th, with two Swallows and four Sand Martins at Chew on the 31st, complete the March list.

April's weather was generally dull, dry and cool. For the first twelve days, anticyclones over Britain gave morning fog and frosts. During this period the migrant situation changed rapidly—there were over 100 Sand Martins at Chew on the 2nd, a total of 34 Ring Ouzels at Wavering Down on the 3rd, and 23 singing Willow Warblers at Chew on the 7th. The district had some of the earliest migrant falls for several species. Our first House Martin, at Chelvey on the 3rd, was among the national leaders. Three Blackcaps in Bristol Forest the same day, and a Yellow Wagtail at Chew on the 1st, were the second earliest, while a Garden Warbler at Combe Dingle on the 5th, six Whitethroats at Long Ashton on the 11th and two Wood Warblers in Leigh Woods on the 13th were respectively the earliest of their species to be reported to the Editors of *British Birds*. From the 16th – 18th, depressions north of Scotland brought showers and S.W. winds, with which the migrants came in force. Little Gulls were unusually plentiful at this time, and the largest concentration reported nationally was at Chew Valley Lake, where 17 were seen on the 24th. From the 22nd the weather was influenced by high pressure north of Britain and 'lows' over central and S. Europe, giving E. and S.E. winds, which halted the northward migration. Heavy rain, turning locally to snow, fell on the 26th, to be followed by fine weather with night frosts.

In May a pair of Red-crested Pochard bred at Frampton Pools, the first breeding record for Glos. or for the Bristol District. On the 14th, an Osprey at the same place afforded fine views, and on the 24th a Little Egret—one of four seen in the country—visited the Wildfowl Trust enclosures. May continued fine, except for rain from the 4th – 7th and 15th – 17th and a few cooler, wet days from the 20th. Most of June was dull and cool, with prolonged rain between the 8th and 20th. On the 6th, a Wren trapped near Wickwar proved to have been ringed in Bournemouth on Jan. 31st. Its movement of some 100 km is a considerable distance for this species. A Golden Oriole seen and heard at Chew Valley Lake on the 12th was one of a number reported in the south of England.

As usual, large flocks of Swifts built up at Chew Valley Lake during the month, with an estimated 10,000 on the 5th, 5,000 on the 19th and 3,000 on the 27th. No large numbers were reported after the 30th. Nationally, there were few reports of sizeable seabird movements in June, but an exception was in the Bristol Channel, where on the 19th and 20th considerable numbers of Manx Shearwaters were present. One small party was accompanied by a Sooty Shearwater, the second record for the district (see p. 111).

July was dry, warm and sunny, with no measurable rain until the 20th. The rest of the month had rather thundery weather. A pair of Herring Gulls bred at Clevedon, a new site. Sea watches from Brean Down yielded numbers of Gannet sightings, with a maximum of a hundred or so on the 25th. Several vagrant *Ardeidae* species seen in the country during the month included an adult Night Heron that spent a week at the Wildfowl Trust. The first half of August was very wet and dull; a gradual improvement led to a warm and dry last week, during which the tenth White-winged Black Tern to be recorded in the district appeared at Cheddar reservoir. Earlier in the month, our first Caspian Tern was seen at the New Grounds. An Ortolan Bunting and a Bluethroat, at Brean Down and Blagdon res. respectively, were two of a group of southern vagrants seen in the country. The post-breeding gathering of Gadwall at Chew Valley Lake again reached a total of some 250 before dispersing rapidly near the end of the month.

September was dry and sunny; the only unsettled period was from the 23rd – 25th. The autumn concentration of Great Crested Grebes at Chew yielded a peak count, on the 9th, of 483 – a few short of 1970's record. The same day, three White Storks were seen over Combe Down and then at Downside School, Stratton-on-Fosse, where one fell down a large chimney and was captured. It bore what proved to be a Danish ring. The other two moved on S.W., and next day reached Bude. In the next few days they were seen at Penzance, Newlyn and St. Mary's, Scilly, and the numbers on the rings which they too carried were read by telescope. Later in the month, one bird was found 'in a bad condition' in Madeira. All three had fledged from a nest in N. Jutland, Denmark, on Sept. 6. The full story, including the remarkable history of the parents birds, is told in *British Birds*, **65**, pp. 4 – 5 (January 1972) to which we are indebted for most of the above details. An Aquatic Warbler at Sand Bay for several days, with a second on one day, provided our sixth record. On the 26th, a Red-necked Grebe appeared at Frampton Pools, a Black-necked or Slavonian Grebe at Chew, and an Avocet at St. George's Wharf. The next day a Long-tailed Skua was seen off Brean Down.

October was the sunniest for fifty years, despite a wet spell from the 12th – 19th, with over two inches of rain on the latter date, and some local flooding. The generally dry autumn, however, resulted in low water levels at Cheddar reservoir, with the exposure of large areas of mud. Up to sixteen Herons were seen feeding together, and Snipe built up to some 150 birds. A Pectoral Sandpiper present for a week from the 16th was one of some forty in the country, little more than half the 1970 total. Other transatlantic arrivals were also scarcer than usual. The autumn Black Tern passage was not large, but was prolonged into November.

November was the sunniest since Long Ashton records started in 1920, although after a first mild week it was cooler than normal, with the winter's first hard frosts. On the 19th, an immature Night Heron was found in the Severnside Works of I.C.I. Ltd. Having been cared for in the meantime, it was released at Chew on the 28th, and from then to Dec. 19 it was viewed from comparatively close quarters by large numbers of visitors. A House Martin at Long Ashton on Nov. 4th and Yellow Wagtails to the 7th, were among summer migrants lingering in the mild autumn. A Curlew Sandpiper was seen at Sand Bay on the late date of Nov. 23, and five Little Stints at Cheddar on the 19th were the largest number reported locally during the year.

There were exceptional numbers of Eiders off the coast of the district in 1971—one was seen in June and three in October, and between fourteen and twenty were present by the end of November. This compares with only nine previous coastal records—single birds in 1902, 1954, 1955 and 1963, three in 1966 and two in 1969. These past small numbers are surprising since the species has wintered off the Gower Peninsula, Glamorgan, since at least 1900, increasing since the Great War until by 1950 birds were present throughout the year (though not breeding), with maxima of well over fifty in recent years.

December was dry until the 18th, but very dull, with only 71% of the normal sunshine hours, though temperatures were above normal. Few large flocks of Fieldfares, and even fewer Redwings, were reported. Siskins were widespread, in some numbers. A German-ringed bird was trapped at Barrow Reservoirs on Christmas Eve.

Rarities. Besides those already mentioned, attention should be drawn to the Lesser White-fronted Goose and the Great Grey Shrike first reported in 1970; and to a Crane in March, a Ring-necked Duck in April, a second Bluethroat, in October; and a Richard's Pipit in Nov. 1970. A warbler seen at St. George's Wharf on Sept. 19 (RS) appeared to be either an Arctic or a Greenish Warbler (the *British Birds* Rarities Committee considered the evidence inconclusive).

Certain other records of rarities, which have reached us at second or third hand, unaccompanied by any details, have been omitted from the systematic list for that reason. They include a Rough-legged Buzzard *Buteo lagopus* at Litton on Sept. 17, a Goshawk *Accipiter gentilis* near Yate on Aug. 30 (this species is known to be flown by falconers in the district and nearby), a second Hen Harrier (a male) at Stoke Park, Bristol on Sept. 24 and a second Osprey at Chew Valley Lake on Sept. 6.

Escapes. Sightings of escaped birds have included a Chilean Flamingo at Cheddar reservoir on Jan. 2 (SBE), a Black-headed Weaver at Sand Point in June (RA), a N. American Wood Duck at Chew from June to August, several Budgerigars in July and August and a Pelican on Sept. 9 (this is presumed to be an escaped bird; curiously, it arrived on the same day as the Danish White Storks). It was reported from Chew Valley Lake and also from Burnham-on-sea, outside our area, and was reported variously as White and Dalmatian. A pelican had been seen over Bucks. on the 6th, and a White Pelican was seen later in the month in Devon and then in Hants.

Habitat Changes. The most important change during the year was the commencement of work on the West Dock scheme, which is involving the construction of a modern dock on the site of St. George's Wharf. Well over a hundred species of bird have been recorded from the Wharf area in the past three years, although only a small proportion of these breed there. It will be interesting to see which species forsake the area, and whether any new ones will arrive, when the work is complete; however, it is with regret that we see this familiar area being so drastically modified.

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Headings **G.** and **S.** refer to South Glos. and North Somerset, and cover the areas defined in *Proc. B.N.S.*, 1971, pages 26 and 45.

RED-THROATED DIVER *Gavia stellata*
S. Two flying up-channel, Brean Down, May 15 and a 'probable' on 18th (BR).

GREAT CRESTED GREBE *Podiceps cristatus*
S. Winter population at reservoirs, end–1970, held until March with rise at Cheddar to 75 (85+, Apr. 11) offsetting fall at Chew Valley. Bred on all major waters (possibly fewer pairs than usual at Chew Valley) except Emborough Pond, where nest abandoned after erection of hide and subsequent disturbance (SBE, JH *et al.*). Several counts of over 400, Chew Valley, Aug.–Oct. (PJC, RGT *et al.*) with max. 483, Sept. 9 (RMC).

RED-NECKED GREBE *Podiceps griseigena*
G. One, Frampton Pools, Sept. 26 (DVM).

SLAVONIAN GREBE *Podiceps auritus*
S. One, Cheddar res., Oct. 30–Nov. 7 (GBB, JAMCG, BR) and one, Chew Valley res., Dec. 11–31 (RA, PJC, RGT *et al.*).

BLACK-NECKED GREBE *Podiceps nigricollis*
S. One, either this species or *auritus*, Chew Valley res., Sept. 26; one definite record, Blagdon res., Oct. 3 (PJC).

LITTLE GREBE *Podiceps ruficollis*
S. At least twelve pairs bred, Chew Valley res.; no other breeding records received.

STORM PETREL *Hydrobates pelagicus*
S. Two or three off Brean Down, moving towards Steep Holm, Apr. 24 (BR).

MANX SHEARWATER *Puffinus puffinus*
S. Noted regularly in channel, Apr. to mid-Aug., with largest movements of 202, Brean Down, June 19 and 225 on 20th; 194

there, Aug. 1 and 106 off Sand Point, same day. Approx. 120 off Brean Down, Aug. 6, and 41 on 7th; 60 off Sand Point on 10th (RA, TB, BR).

SOOTY SHEARWATER *Procellaria grisea*

S. One flying upstream off Brean Down, June 19 with party of ten Manx Shearwaters. An all-brown bird, with typical shearwater flight, larger-bodied and longer-winged than Manx (RA).

(A previous sighting, off Sand Point, Sept. 17, 1962 (NJC) was considered at that time to be a highly probable record of this species, but not 100% conclusive. The details have been re-assessed, and the B.N.S. and Somerset Editorial Committees have independently agreed that the record should be accepted. It becomes the first for the County, with the 1971 record as the second).

FULMAR *Fulmarius glacialis*

S. Noted on 18 dates off Brean Down, April 16–Aug. 7; possibly same birds on many occasions, but 9 together, June 12 and sightings of 6, 7 and 8, same day (RA, BR). Up to three, Sand Point, six dates, June 19 – Nov. 21 (RA, TB).

GANNET *Sula bassana*

G. One flying inland to E., Frampton on Severn, Oct. 20 (GBB). One dead, Chittening, Nov. 4/5 (TDE, NTL).

S. Weston – Sand Bay area: one or two, May 6 – June 19 then up to eight to July 21; 100 on 25th and 28+ on 26th; 24, Aug. 1 and 37 on 6th, 16 on 8th, seven on 15th then up to three, Sept.–Oct. and one on Nov. 10 (RA, TB, BR).

CORMORANT *Phalacrocorax carbo*

Regularly observed moving from Steep Holm breeding colony to feed at reservoirs, where max. counts of 19, Cheddar, Dec. 12 and up to 39 (roosting), Chew Valley, Jan. – Mar. and 47, Dec. 26. Smaller numbers at other waters and along coast as far as Frampton, where max. of nine seen in autumn.

SHAG *Phalacrocorax aristotelis*

S. One, Sand Point, Aug. 12; two, Cheddar, Aug. 17–Sept. 3 and one on 30th; one to N.E., Brean Down, Sept. 25 (RA, RMC *et al.*).

HERON *Ardea cinerea*

Reduction in breeding population from 89 or 91 nests in 1970 (not 80 quoted in 1970 Report) to 78 or 79 nests. Usual reports from coast, moors, rivers (with 18, Keynsham, July 11) and reservoirs—up to 20, Chew Valley, several dates, and up to 16, Cheddar, when water level fell in November. Cross-channel movements noted from Brean Down, May and July.

LITTLE EGRET *Egretta garzetta*

G. Adult, perched and preening in Willow tree, W.T. enclosures, May 24; also seen in flight (LPA). Details include pure white plumage with long drooping crest plumes, long slender black bill and black legs with yellowish feet.

NIGHT HERON *Nycticorax nycticorax*

G. Adult or sub-adult, W.T. enclosures, July 4 – 11 (LPA, PLG, EEJ *et al.*), observed down to 10–15 yards. Diagnostic points: dull blackish crown and back, grey wings and tail (upper and lower surfaces); whitish breast and belly; short blackish bill; red eyes; in flight, squat compact neckless 'oval' shape, broad rounded wings, legs scarcely visible beyond tail; distinctly 'corvine-like' single loud barking call note, 'kwuk'.

Immature found in I.C.I. Severnside Works, Nov. 19, cared for by JTE; ringed and released at Chew Valley res. on 28th; last seen, Dec. 19. Records, second and third for area, accepted by *Brit. Birds* Rarities Committee. (Cf. *Proc. B.N.S.*, 1950, p. 183).

BITTERN *Botaurus stellaris*

G. One in W.T. enclosures, Jan. 26 (JS).

S. One, Chew Valley res., Feb.–Mar. (two, Mar. 7) and Nov.–Dec. (PJC, RMC *et al.*).

WHITE STORK *Ciconia ciconia* *See page 107*

S. Three juvs. of Danish origin, Combe Down and Stratton-on-Fosse, Sept. 9. One caught and taken to Rode Bird Gardens (per RMC).

MALLARD *Anas platyrhynchos*

Counts suggest total of *c.* 1,700 in area during January, falling to *c.* 1,200 by mid-February. Very large total of 2,060, New Grounds, Sept. 14 but N. Somerset peak not reached until Nov.–Dec., when some 2,500 reported. Breeding records include clutch in old Crow's nest, 25 ft. above ground.

TEAL *Anas crecca*

Total of *c.* 650 in area, mid-January, falling to 200 by mid-March and only odd birds present, May – July. Autumn—steady increase at New Grounds from 125, Aug. 23 to 450, Sept. 14 and 660 on 28th; less than 250 in N. Somerset, latter date, but *c.* 500, Chew Valley res., by Oct. 10; large numbers, Cheddar res., Oct.–Dec. (due to low water levels), with 300, Oct. 30; 520, Nov. 13; 1,090 on 21st and 712, Dec. 11).

GARGANEY *Anas querquedula*

G. Two males, New Grounds, Mar. 14 and one, Apr. 24; three (2 ♂♂) Frampton Pools, Mar. 28 and a male on 30th. Six, New Grounds, Aug. 21 and four on 22nd.

S. Male, Chew Valley res., Apr. 24. Autumn records from Cheddar and Chew Valley resrs., Aug.–Sept. (last seen, six, Sept. 26).

GADWALL *Anas strepera*

G. Bred, Frampton Pools (3rd record). New Grounds total, 152, Sept. 24 and 226, Nov. 25.

S. Only a few over-wintering, resrs.; influx end Feb., mainly at Chew Valley res., where 50 on 24th and 65, Mar. 14; much smaller numbers elsewhere. Bred, Chew Valley, where usual post-breeding gathering: 157, Aug. 7; *c.* 250 on 26th but only 40, mid-Sept.; *c.* 30 in Oct. and up to 20, Nov.–Dec. Increase, Cheddar res., early Sept. to 30 by 10th, 45 on 30th, 65 on Oct. 21st then between 16–30 in Nov. (but 51 on 26th) and up to 20, December.

PINTAIL *Anas acuta*

G. New Grounds: 500, Jan. 28; 46, Oct. 22; 66 on 28th; 64, Nov. 4 and 129 on 18th; *c.* 100, Nov. 25, Dec. 2 and 21st.

S. Only a few present. Largest numbers: 20, Chew Valley res., Oct. 10; 23, Cheddar res., Dec. 6; 31 on 11th and 30 on 12th.

SHOVELER *Spatula clypeata*

G. Max. counts: 20 (+), Frampton Pools, Jan. 3, and 18, Oct. 2; 250, W.T. enclosures in Jan.; 114, Oct. 28; 76, Nov. 14; 134 on 25th and 70, Dec. 2.

S. Cheddar res.: 48, Jan. 2 and 54 on 16th; 70, Oct. 30 but only 20, Nov. 13. Blagdon res.: party of 250, Feb. 28; 75, Mar. 7 and 40–50, Oct.–Nov. Bred, Chew Valley res., where up to 45 ads. in Jan., 70 in Feb., 106 in March; large influx, late Aug.—213 on 27th; 312, Oct. 10 and up to 325 in November–December.

RED-CRESTED POCHARD *Netta rufina*

G. Frampton Pools: three, Jan. 10 (GBB); pair bred—ad. with juv., May 15 (TDE)—the first breeding record for the County and the Bristol area; three, Aug. 28; five, Oct. 2 and one, Nov. 14, 20 (MCK, BAO *et al.*). Female, Littleton Pits, Apr. 4 (JDRV).

S. Two (♀♀ or immatures), Chew Valley res., Aug. 27 (PJC).

SCAUP *Aythya marila*

G. Seven, Frampton Pools, March 25 (GY).

S. Male, Cheddar res., Jan. 3 – Mar. 13 and Oct. 31 to end year. Single birds, Blagdon res., Feb. 14, Mar. 14 and Chew Valley res., Mar. 20 – Apr. 25. Flock of 8 (4 ♂♂) off Brean Down, Nov. 14, 17 (GBB, RMC, BR *et al.*).

TUFTED DUCK *Aythya fuligula*

Some 650 in area, mid-Jan., rising to 750, mid-Feb. but 600, mid-March. Bred, Frampton Pools (3 broods), Blagdon res. (1 brood) and Chew Valley res. (at least 38 broods). Up to 400, Chew Valley, Aug.; 530, Blagdon, Aug. 22—possibly birds from Chew. Approx. 800 in area, mid-Nov., and *c.* 1,000 in December.

POCHARD *Aythya ferina*

Another poor year. Area total (750, end–1970) was *c.* 875 in Jan. but only half as many in February. Female with two imms., Frampton Pools, June 19—first breeding record for Glos.; two broods, Chew Valley Lake. Autumn influx first noted, as usual, at Cheddar res.—33, Aug. 27; 95, Sept. 3; 210 on 10th and 512 on 16th; later counts reflect yachting activities. Area total *c.* 650, mid-Nov. and 800 in December. One ringed as nestling nr. Zandvoort, Holland, shot, Brean Down, 2nd Jan. 1969.

RING-NECKED DUCK *Aythya collaris*

S. Adult male, Blagdon res., Apr. 4–24 and Chew Valley res., May 2 (SBE, RMC, WU, KEV *et al.*). *Brit. Birds* Rarities Committee, in accepting record, comment on high risk of escape with this species. Second record for area—cf. *Proc. B.N.S.*, 1955, p.144.

GOLDENEYE *Bucephala clangula*

G. Frampton Pools: up to three, Jan. to March, and five (2 ♂♂) in early April; single birds, Oct. 29 to end of year (two, Nov. 14).

S. Present till Apr. 10, with max. resr. counts of 13, Cheddar, Feb. 20; 45, Chew Valley, Mar. 4; and 23, Blagdon, Mar. 14. Winter immigrants from Oct. 10 with up to 14, Chew Valley; 13, Blagdon and 12, Cheddar, but area total probably not over 30.

COMMON SCOTER *Melanitta nigra*

G. Male, Frampton Pools, Mar. 2 and female on river, Sept. 20 (LPA).

S. Frequently seen off Brean Down, Mar. 21 to July 4, with max. of seven, Mar. 21, Apr. 6 (BR *et al.*); party of 11 to N., Nov. 21 (GBB). Female, Cheddar res., Aug. 28–Sept. 2 (PJC *et al.*).

EIDER *Somateria mollissima* *See page 108.*

S. Male off Steep Holm, June 27 (BR). Two off Sand Point, Oct. 16–20, and three, Oct. 26–Nov. 14 (TB, RNC *et al.*); 14, Nov. 21 increasing to 19 by end of year (RA, RMC *et al.*). Four (one ♂) off Clevedon, Nov. 16 (WBC) and two off Brean Down on 17th (BR).

RED-BREASTED MERGANSER *Mergus serrator*

G. Female or immature, Frampton Pools, Nov. 14 (NR).

S. Two males to S., Brean Down, on late date of May 17 (BR). Pair, Chew Valley res., Nov. 6 (SBE) and single female or immature bird there, Nov. 21–Dec. 12 (RA, PJC).

GOOSANDER *Mergus merganser*

G. Single bird, Frampton Pools, Nov. 28–Dec. 18.

S. Up to 11, Chew Valley res., Jan.–Feb., but 14, Feb. 21, and 13 to mid-March; reduced to six by early April, and one on 18th. Autumn records there from Nov. 13, with 15 present, end month, and 21, Dec. 12 to end year. Few records from Blagdon res.—one, Jan. 17, two or three, mid-March and three, Nov. 14; probably birds from Chew Valley, accounting for fluctuations in totals reported. Two, Cheddar res., Nov. 17.

SMEW *Mergus albellus*

S. Male, Chew Valley res., Jan. 5–21, with two females on 9th; two males, 22nd to Feb. 7, then only one to Mar. 20, second having moved to Blagdon. Single females, Cheddar, Dec. 12; Chew Valley, 18th–28th; and Blagdon on 19th.

NORTH AMERICAN RUDDY DUCK *Oxyura jamaicensis*

G. Pair with six ducklings, Frampton Pools, July 17; up to seven birds there, October (TDE).

S. Up to 46, Chew Valley res., and up to 15, Blagdon res., Jan.–Mar., but total probably not exceeding 55. After successful breeding, Chew Valley (2 pairs), numbers again increased, reaching approx. 25 in mid-December (10, Blagdon and 15, Chew, Dec. 5).

SHELDUCK *Tadorna tadorna*

Breeding season survey showed population, June 14–21, of *c.* 180 ads. and 45 pulli, New Grounds–R. Avon (mostly in New Grounds area) and *c.* 254 ads. and 94 pulli, R. Avon–Birnbeck I.; at least 16 pulli appeared later in latter stretch. Two–three pairs, Chew Valley res., May, but no proof of breeding.

WHITE-FRONTED GOOSE *Anser albifrons*

G. New Grounds: final 1970 total of 3,650 rose to 5,500 by Jan. 10 and 6,000 on 18th to 22nd but fell to 4,800 by Feb. 18, with gradual decline to 1,320 on Mar. 9 and 400 on 11th; last seen (two) on 12th. Autumn arrivals—ten, Oct. 5, increasing to 94, Nov. 11, and 400 on 26th; 700, Dec. 1; 1,210 on 16th and 1,810 on 30th; only 10·2% juvs., indicating a poor breeding season (WT). Flock of 30 seen and five or six flocks heard in fog near Severn Beach, Jan. 3. Some 200 over Redland, Bristol, 7 p.m., Mar. 9 (JFR). Very small numbers noted, Littleton on Severn and Northwick Oaze in December.

S. Records, mostly from coastal areas, include: eleven, St. George's Wharf, Jan. 1 and six on 3rd; 25 over Clevedon, Jan. 4; seven, Sand Bay, Jan. 4, 30 on 12th and 16 on 24th; two there, Feb. 2 and eleven, Dec. 30; four over Abbot's Leigh, Feb. 27.

Reservoirs: 46 over Cheddar, Jan. 2 and seven, Chew Valley, Dec. 23.

Lesser White-fronted Goose *Anser erythropus*
G. Adult bird, first noticed with albifrons, New Grounds, mid Dec. 1970, stayed to Feb. 18 or later (WT).

Bean Goose *Anser fabalis*
G. One of the Russian race, *A. f. rossicus*, New Grounds, Jan. 10–Feb. 18, and one, *A. f. fabalis*, Oct. 8—end year (GBB, WT).

Pink-footed Goose *Anser brachyrhynchus*
G. Eight or nine, New Grounds, Jan. 10–23; one still there, Feb. 3, being last seen on 24th (LPA, WT).

Dark-breasted Brent Goose *Branta b. bernicla*
G. One on estuary, Chittening, Oct. 27 (RA). A juv., with Whitefronts, New Grounds, Dec. 2 to end year (GBB, WT). Two on estuary, Aust, Dec. 26 (NTL).

Barnacle Goose *Branta leucopsis*
G. Up to five, with Whitefronts, New Grounds, Jan. 4–Feb. 8; single bird only, Feb. 9 and 22nd (WT).

Canada Goose *Branta canadensis*
G. Thirteen pairs bred, Frampton Pools. Some control (egg, gosling and adult removal) exercised at owner's request (MAO).
S. Party of three, Chew Valley res., July 25 to end year.

Whooper Swan *Cygnus cygnus*
G. Pair in Wildfowl Trust enclosures from Dec. 22, 1970 to Jan. 19; same pair present, Dec. 29–31 (WT).

Bewick's Swan *Cygnus columbianus See page 105*
G. New Grounds: 350, Jan. 1; 402 on 7th and 412—a new daily record—on 9th; 411 on 16th, then unusually early departure in mild wet weather over next 12 days, to 243, Jan. 29; 243, Feb. 7; 47 on 14th; 25 on 21st; 27, Mar. 9; 11 on 10th and eight on 17th-22nd; total of 626 individuals recorded during season (18% cygnets). Autumn arrivals at W.T. from Oct. 25 (five), rising daily to 61 on 28th; 63, Nov. 9; 159 by 13th; further influx on 20th to 189 with steady increase thereafter to 297 on 31st; 362 different birds present in period, but only 35 juvs. (WT). Three, Chittening, Jan. 3 and seven, Severn Beach, Mar. 7 (NTL). Three, Frampton shore, on late date of Apr. 25 (BAO). Eight, Frampton Pools, Nov. 20 (GBB) and four, Dec. 12 (BJM); eight in cereal field, Aust, Dec. 12 (JDRV).

S. January total at Chew Valley and Blagdon resrs. much larger than usual: 100–130, about 75% at latter. Autumn arrivals from Oct. 30—four, Cheddar and 11, Chew Valley; majority of records from these two resrs.—up to four, Cheddar to Nov. 26; 19 on 27/28th and max. of 28, Dec. 8; 15 by Dec. 12 and nine on 26th; Chew Valley totals of 15, Nov. 7; 25 on 12th and 13th, and 43 on 21st (24 to S.W., Brean Down, same day); 12, Nov. 27, and four, Dec. 5 (AEB, WGB, KAF, HWN *et al.*). Six, Sand Point, Nov. 9 (TB); three to W., Abbots Leigh, Nov. 28 (TBS); eight off Brean Down, Dec. 24 (BR) and seven, Blagdon, Dec. 29 (CCD).

BUZZARD *Buteo buteo*

G. Reported during breeding season from Cromhall—three, May 1 (JH). Autumn and winter records from Severn Beach, Patchway, Stoke Park (Bristol), Almondsbury, Michaelwood, the southern Cotswolds and Frocester.

S. Two pairs bred successfully, Mendip localities (DW). Other breeding season reports from Mendip, Sand Point, Congresbury, Backwell, Flax Bourton, Portishead, Failand, Abbots Leigh, Marksbury, North Stoke and Langridge nr. Bath. Recorded in autumn and winter from Mendip, Weston Wood, resrs., Mells, Nailsea and Kenn Moors, Walton-in-Gordano and St. George's Wharf where one was seen with Hobby, Sept. 12 (WGB).

SPARROWHAWK *Accipiter nisus*

G. Breeding season reports from Chittening, Aust, Marshfield, Inglestone Common and Frampton Pools. Pair bred, Hallen (NTL).

S. Bred, Blagdon res., Litton and Failand (PJC, DW). Records from many localities including Bristol and outskirts, Apr.–July. One chasing kingfisher, Chew Valley res., Nov. 7 (SBE).

HONEY BUZZARD *Pernis apivorus*

S. The Somerset Bird Report for 1970 has a report, with full details, of one over Chew Valley res., May 22, 1970, seen by J. G. Hole—this is the first record for the County since 1917.

MARSH HARRIER *Circus aeruginosus*

G. One, New Grounds, flying S., Oct. 23 (PLG).

S. One, Brean Down, May 15 (BR).

HEN HARRIER *Circus cyaneus* *See page 109*

S. Female or imm., Sand Bay, Mar. 4 (TB).

OSPREY *Pandion haliaetus* *See page 109*

G. One, adult, Frampton Pools, May 14 (MAO, MJD'O).

Seen on wing and perched at 30 yds. range, close enough 'to see fierce yellow eyes'. Absence of pale edgings to dark brown wings and upperparts noted. It gave 5 or 6 whistling calls on taking flight.

HOBBY *Falco subbuteo*

G. Single birds, Cromhall, May 8 (JH); Severn Bridge, May 16 (PGL); Frampton Pools, June 5 (and two there, Aug. 21, Sept. 26) (RKB, RHC, TDE *et al.*); and New Grounds, Sept. 6–8 and 20th (LPA).

S. Single birds, Kewstoke, May 31 (TB); Middle Hope, June 13 (RA); Sand Point, July 14 (RA); Chew Valley res. and neighbourhood, various dates, July, Aug. and Sept. (GBB, WGB, DW *et al.*); Litton, Sept. 26 (DW); nr. Keynsham, June and July (RMC, BK, WU); Congresbury, Aug. 16 (WJH); and one, St. George's Wharf, various dates, June 24–Sept. 12—seen taking sparrows from Avonmouth Docks, Aug. 31 (WJH, TBS).

PEREGRINE *Falco peregrinus*

G. New Grounds: female, Jan.–Apr. 11 (LPA, GBB *et al.*) and Sept. 5 to end year (LPA, PLG). Female, mobbed by Yellow Wagtails, New Passage, Sept. 1 (NTL), and one, same place, Dec. 4.

S. Imm. ♂, Weston Bay, Feb. 20 (RA). Single birds: Sand Bay, Feb. 23 (TB); Brean Down, Mar. 20, Apr. 10, Nov. 28 (RA, TB, BR); Sand Point, May 4, Nov. 21 (RA, TB); Steep Holm, Oct. 5 and 9th (MJB, CL, RHP); Chew Valley res., Nov. 3 and St. George's Wharf, Nov. 21 (WGB).

MERLIN *Falco columbarius*

G. Single birds: ♂, Frampton Pools, Jan. 31 (RKB); Acton Turville, Mar. 21 (DCSD, KGH); ♀, New Grounds, Oct. 26 (LPA).

S. Single birds: ♂, Sand Point, Jan. 3, Mar. 3, Dec. 9 (TB); Sand Bay, Jan. 15 (TB); St. George's Wharf, Feb. 7 (WGB); ♂, Blagdon res., Feb. 27 (KTS); ♀, Portbury, Aug. 22; ♀, Brean Down, Sept. 3 (BR); Abbots Leigh, Sept. 29 (TBS); Yeo Estuary, Oct. 15 (TB); Woodspring Bay, Nov. 6 (TB); ♀, Winford, Nov. 28 (DP); ♂, nr. Bathampton, Dec. 11 (GS).

KESTREL *Falco tinnunculus*

G. Breeding reported from Chittening, Tockington, and Marshfield (PJC, DH, JFR). Four together, Cromhall, July 11 (JH).

S. Bred, Whitchurch—5 young reared—and Queen Charlton where three young reared from four eggs in old nest site (PGF). Breeding behaviour or juvs. seen later in summer at Crook Peak, Winscombe Hill, Cheddar res., Bradley Cross nr. Cheddar, White Hill, Charterhouse, Bishop's Sutton, Marksbury, Chelvey, Kenn Moor, Nailsea Moor, Backwell, Bower Ashton, St. George's Wharf, Saltford and Kelston nr. Bath. Single birds seen, all months, at both Ashton and Flax Bourton ends of Long Ashton Bypass (MJH).

RED-LEGGED PARTRIDGE *Alectoris rufa*

G. Pair, Kingscote, Apr. 28 (EMA, WMC).

S. One, Brean Down, Apr. 16 (RA, BR). Brood of at least six, Queen Charlton, July 13 (PGF). Probably bred, Sand Point.

PARTRIDGE *Perdix perdix*

G. Breeding season reports from Mangotsfield, Marshfield, Cromhall and New Grounds. Four, Woolaston, Oct. 28 (JDRV).

S. Covies of ten, Nailsea, Jan. 18 and six, Dec. 22 (HRH); and nine (7 juvs.), St. George's Wharf, Sept. 4 (WGB). Up to 15, Newton St. Loe, Nov. 13; 27, Kingston Seymour, Sept. 16 (WBC). Breeding season reports from six other localities. Nine infertile eggs in clutch of 14, Nailsea, July 20 (HRH).

QUAIL *Coturnix coturnix*

G. Three or four, Marshfield, June 13, July 20 (PLG, PGL).

S. One, Queen Charlton, June 30 (PGF).

CRANE, *Grus grus*

S. One flying N. along coast, Clevedon, Mar. 31 (HRHL). Record accepted by *Brit. Birds* Rarities Committee.

WATER RAIL *Rallus aquaticus*

G. One or two, New Grounds and Frampton Pools, Oct. and Nov.; one, Northwick Oaze, Dec. 11 (NTL, NR).

S. Breeding season records from Chew Valley res.; a juv. ringed, Blagdon res., late Aug. (PJC). Winter records include one, Kennet & Avon Canal, and a storm-driven bird at Whitchurch, Dec. 19.

SPOTTED CRAKE *Porzana porzana*

S. One, Chew Valley res., Sept. 4–13 and Oct. 3, seen to be carrying a ring above the tarsal joint (PJC, RMC, WJH).

COOT *Fulica atra*

S. Max. counts, Cheddar res., *c.* 1,900, late Jan.–early Feb. and 1,800, early December (PJC, BR).

OYSTERCATCHER *Haematopus ostralegus*

G. Up to three, New Grounds, Jan.–June 7 (six, May 30) and July 20–Aug. 23. Single birds, Chittening, May 29, July 22 and Aug. 23, with six there, Aug. 15.

S. Noted, coast, Jan.–Mar. 27 and Aug. 14–Dec.; max. counts (Jan., Feb., Nov., Dec.) six, Clevedon, 25, Sand Bay and 170, Axe Estuary area. Reservoirs: two, Chew Valley, Mar. 28; one or two, there and Cheddar, late July to mid August.

Lapwing *Vanellus vanellus*

G. Largest flocks: *c.* 2,000, New Grounds, June 30 to end Aug. (building up from 52, June 4) (LPA); 790, Sheperdine, Feb. 6 (JDRV); up to 350, Chittening–New Passage, July, August.

S. Breeding proved, St. George's Wharf, Nailsea Moor, Clevedon coast and West Harptree. First post-breeding flocks: 100, Clevedon shore, June 12 (JFB) and 500, Nailsea Moor, 15th (SMT). Passage to S. over Cheddar res., Sept. 1—over 1,000 in 1 hr. (SBE). Largest flocks Axe Estuary, where 1,200, Jan. 23 and 1,600, Nov. 6 and 2,300, Dec. 25 (RA).

Ringed Plover *Charadrius hiaticula*

Fewer on passage than in last two years. Reservoirs: single birds, Chew Valley, Feb., and Cheddar, Apr., Aug.; up to three, Blagdon, up to nine, Cheddar and up to 18, Chew Valley, Sept.–November. Coast: 115 records (67 in **G.**), all months.

Monthly peak counts in main areas: (A) New Grounds; (B) Severn Beach–Chittening; (C) St. George's Wharf; (D) Clevedon–R. Yeo; (E) Sand Bay; (F) Weston Bay–R. Axe.

	(A)	(B)	(C)	(D)	(E)	(F)
Jan.		41	28		3	30
Feb.		75				13
March		50				18
April	3	40				
May	104	400	1	8		
June	75	150		54		45
July	8	35				
Aug.	500	750	71		400	163
Sept.	320	400	51			
Oct.	6	200				
Nov.		100				43
Dec.		100				

Little Ringed Plover *Charadrius dubius*

G. Single birds, New Grounds and Frampton Pools, Apr. 11–May 22 and July 26–Aug. 24 (LPA, JDS). One, Severn Beach, July 24 (CJ) and one, immature, same place, Sept. 26 (DVM).

S. One, Cheddar res., Apr. 16 (BR); two, Chew Valley res., on 18th and one, May 25 (NTL).

Kentish Plover *Charadrius alexandrinus*

G. One, New Grounds, Apr. 27 (LPA).

Grey Plover *Charadrius squatarola*

G. Markedly fewer than in 1970. Eight coastal records of up to three birds, Jan.–May 25 and sixteen of up to five, Aug. 19–Dec., but 9+, New Grounds, Oct. 9 (TDE).

S. Up to five, coast, Jan.–May 22 (11 records) and Aug. 18–Nov. (7 records). One, Chew Valley res., Sept. 9 (KEV).

Golden Plover *Charadrius apricarius*

G. Up to four, New Grounds, Feb. 17–May 23 and July 22–Nov. 6; one, New Passage, Oct. 2; 35–40, Tormarton, Dec. 5.

S. 28 records. Only counts over ten birds were: 86, Clevedon–R. Yeo, Jan 21; 25 there, Feb. 14; up to 40, Chew Valley res., end Jan.; 21 there, Nov. 7 and up to 110, late Dec.; 130, Axe Estuary, Sept. 7 and 200–250, Nov., and Dec. 6 to end year.

Turnstone *Arenaria interpres*

G. Chittening–Severn Beach: up to 150, Jan.–Apr. 23; 75, early May, then max. of ten until 80, July 28; up to 250, Aug.–Dec., but max. 400, October. Elsewhere on coast, up to 12, May and late July–Oct., but 32, Sheperdine, Oct. 23.

S. Up to four, coast, all months, with up to 12, Clevedon, Feb. and Oct., and 30, March. Reservoirs: one or two, Chew Valley, Apr. 18 and early Sept., and Cheddar, May and Aug. 29.

Common Snipe *Gallinago gallinago*

G. Eleven records, mostly from Frampton Pools, where 32, Feb. 2 and up to 20, Aug.–October.

S. Records (69) from coast, moors and reservoirs, Jan. 1–May 12 and Aug.–Dec., with max. counts of up to 50, Kenn Moor, Jan., and 200, Nov.; up to 120, Axe Estuary, Jan., and 40, Feb.; 75, Clevedon coast, Feb.; 60–70, Nailsea Moor, Aug.; 60, Chew Valley res., Sept., and 40, Dec.; numbers built up at Cheddar res. from ten, late Sept. to 150, late Oct.–Dec., as falling water level exposed mud.

Jack Snipe *Lymnocryptes minimus*

G. Single birds,Sharpness, Jan 17; Chittening, Jan. 17, Mar. 14; Frampton Pools, Mar. 14 (and two, Oct. 29); Yate Rocks, Aug. 30.

S. Records (18), Jan.–Apr. 25 and Sept. 11–Dec., mostly of single birds; but two, Axe Estuary, Feb. 10 and Chew Valley res., Sept. 11 and three, Weston-s-Mare Airport, Dec. 31.

Woodcock *Scolopax rusticola*

Twelve reports of single birds, Jan.–Mar. and Oct.–Dec., from: **G.**—Luckington, Patchway and Hallen-Compton Greenfield area, where NTL flushed five single birds from woodland, Dec. 13; and **S.**—Chew Valley res., Sand Bay, Ashton Hill Plantation and Bristol Forest.

Curlew *Numenius arquata*

Present all months. Peak counts: **G.**—200–300, New Grounds, Jan., Mar., July–Sept. with 580, Feb. (LPA, PLG); 150, Chittening, Feb., Aug.–Oct., with 250, July (NTL); 250, Littleton–Aust, Dec.

(where not normally seen in large numbers) (JDRV); **S.**—Axe Estuary and Brean Down: 500, Jan. (RA) and 250, Dec. (RCP); Sand Bay: 100–110, Aug. and 220, Oct. (RA, TB); 200, St. George's Wharf, Sept. (WGB). Occasional records of single birds, Cheddar and Chew Valley resrs., Mar., Apr. and July–November.

WHIMBREL *Numenius phaeopus*

Spring: 38 records (14 in **G.**, mostly from New Grounds), Apr. 17 –June 19, mainly of under 15 birds, but with up to 50, early May. Autumn: 32 records (6 from **G.**), July 9–Oct. 9; max., 16, Clevedon, Aug. 18.

BLACK-TAILED GODWIT *Limosa limosa*

G. Nine records, Jan.–May 23, of one or two birds; 19 records, July 10–Sept. 9 of up to 12, mostly at New Grounds.

S. Coast: five records of up to five, Jan.–Apr. 29; 15 records, July 10–Nov. 23, mostly of up to seven, but 200–250, Weston Bay area, Sept., and 120–130, late Oct.–early November. Three, Tickenham Moor, Aug. 15 (HRH). One or two, Chew Valley res., August.

BAR-TAILED GODWIT *Limosa lapponica*

G. Records (23), Apr. 10–May 25, of up to 40, mostly at New Grounds, where also one bird, Sept. 5–21 (LPA *et al.*).

S. Coast: 17 records, Jan.–Mar. 13, of up to 16 birds, but 36, Sand Bay, Jan. 3 (TB); 11 records, Aug. 13 to end year, mostly of up to three birds, but up to 21, Weston Bay area. Single birds, Chew Valley res., several dates, Sept.–October.

GREEN SANDPIPER *Tringa ochropus*

Coast and scattered inland localities: winter and autumn records of one or two, Jan.–Apr. 17 and Sept. 29–Dec.; passage records, July 11–Sept. 15, with peak in late Aug.–Sept., when parties of up to eight or nine seen, coast.

WOOD SANDPIPER *Tringa glareola*

G. One, Severn Beach, July 31 (GY).

S. One, Woodspring Bay, Aug. 17 (TB); one, Chew Valley res., Aug. 20 (KEV).

COMMON SANDPIPER *Tringa hypoleuca*

Winter records of one or two, R. Avon (Sea Mills–St. George's Wharf), Jan.–Apr. 4 and December. Coast and reservoirs: up to ten, Apr. 4–May 12 and up to 20, June 26–Oct. 3, with peak, late July–mid Aug.; 19, incl. 12 at roost, seen from steamer, Avonmouth–Hotwells, July 26 (BLK). Three, Kingston Seymour, Oct. 30 (JFB).

REDSHANK *Tringa totanus*

Present all months. Up to 150, Chittening and 100, Clevedon, Jan.–March. Bred, St. George's Wharf and Clevedon coast. Autumn peaks, Chittening: 400–500, July 30–Aug. 6; 250, Sept. 7 and 300, Dec. 27; 160–240, Sand Bay, Aug.–Dec.; 200, Clevedon, Oct., and Weston Bay, November. Occasional single birds, reservoirs, Jan.–April. 118 records (68 in **G.**).

SPOTTED REDSHANK *Tringa erythropus*

G. New Grounds: one, Apr. 13 and two, May 9; up to 14, June 13–Oct. 19; up to 16, Frampton Pools, October.
S. One, St. George's Wharf, Apr. 10. Single birds, there and Cheddar and Chew Valley resrs., Aug. 21–Sept. 26. One, Sand Bay, Nov. 23.

GREENSHANK *Tringa nebularia*

Winter and spring: single birds, Kenn Moor, Jan. 22 (HRH); St. George's Wharf, Mar. 11 (GAF, JFR); New Grounds, May 11 (LPA) and Clevedon, June 12 (JFB). 77 records, July 10–Nov. 1 from coast, resrs., and Frampton Pools—mostly of up to three birds, but up to nine, late July–early September.

KNOT *Calidris canutus*

Winter: recorded on coast, Jan.–Mar. 28 and Oct. 23–end year, with up to 100, Chittening to Severn Beach, and up to 1,000, Sand Bay to Axe Estuary (where 3,500, Jan. 4–TB). Passage records, single birds, Severn Beach, May 7–17 (NTL) and New Grounds, May 25 (LPA); up to 30, coast, July 22–Sept. 24; one, Cheddar res., Aug. 27 (BR).

PURPLE SANDPIPER *Calidris maritima*

G. Up to five, Chittening–Severn Beach, Jan.–May 11 and November, December.
S. Brean Down: one, Mar. 28; up to three, Sept. 9–December.

LITTLE STINT *Calidris minuta*

G. One, New Grounds, May 23 (JDS); up to four, Aug., and one, Sept.–Dec. (with two, Oct. 23–PLG).
S. Noted, Sand Bay, Aug. 21 to Nov. 23—two, Oct. 6 and three, Nov. 23, otherwise single birds (RA, TB). Single birds, Chew Valley res., Sept. and mid-late December (RMC, BR *et al.*). Five, Cheddar res., Nov. 19 (WLR).

PECTORAL SANDPIPER *Calidris melanotos*

S. One, Cheddar res., Oct. 16–23 (RMC, JAMCG, BR *et al.*).

Details include: slightly larger than nearby Dunlin; stretched neck up frequently, when shape not unlike small Reeve. Dark, slightly decurved, medium length bill;

crown dark, with pale supercilium; upper parts dark with light buff feather edgings forming 'snipe-like' stripes; throat and upper breast streaked grey-buff, ending abruptly and contrasting strongly with white underparts. Hard to see when standing still in reedy areas. Very active; fed with Dunlins and alone. Flight dashing, erratic, reminiscent of snipe; no conspicuous wingbar.

Dunlin *Calidris alpina*

Most abundant wader locally. Reservoirs: 43 records of up to 40, Jan.–Apr. 25 (mostly at Chew Valley) and July 11–Dec. (mostly at Cheddar). 150, Kenn Moor, Nov. 27 (RCP). Coast: 181 records (110 in **G.**). Monthly peak counts in main areas:

(A) New Grounds; (B) Severn Beach–Chittening; (C) St. George's Wharf; (D) Clevedon–R. Yeo; (E) Sand Bay; (F) Weston Bay–R. Axe.

	(A)	(B)	(C)	(D)	(E)	(F)
Jan.	600	3,000	1,000	200	3,000	2,500
Feb.	700	1,800	1,000	500	500	2,000
March	400	2,000	1,000	1,200	500	600
April	350	1,000		50		
May	200	650		20		
June	55	80		20		
July	670	500		10		
Aug.	796	500		many	350	300
Sept.	230	100			250	
Oct.	700	1,500		2,000	250	
Nov.	700	2,000	1,000	2,000	2,500	1,700
Dec.	1,500	3,000	850	20	3,500	7,000

Curlew Sandpiper *Calidris testacea*

G. Up to four, New Grounds, Aug. 5–Oct. 23 (LPA, PLG, JDS).
S. Single birds, Clevedon, Feb. 13 (JFB); Axe Estuary, June 8, 10 (JFB) and Sand Bay, Nov. 23 (TB). Two, Chew Valley res., Oct. 8, 10 (SBE).

Sanderling *Crocethia alba*

G. Up to 11, New Grounds and Chittening, Apr. 13–June 13; but 35, New Grounds, June 1 (LPA). Up to nine, mostly at New Grounds, Aug. 7–Sept. 12. One, Severn Beach, Dec. 19. 30 reports.
S. Up to five, Sand Bay–R. Axe, Jan.–Mar. 13 and up to 12, Oct. 30–Dec. 25. Passage records, Sand Bay: 15, May 23 and up to 11, Aug. 4–Sept. 17. 21 reports.

Ruff *Philomachus pugnax*

Reports (66, 34 from **G.**), coast and reservoirs, all months but December, of up to four birds, with up to six, Axe Estuary and up to 11, New Grounds, September and October.

Avocet *Recurvirostra avosetta*

S. One, St. George's Wharf, Sept. 26, in a flock of Curlews, Lapwings and Redshank (WGB).

ARCTIC SKUA *Stercorarius parasiticus*

G. Dark-phase adult, estuary, New Grounds, Sept. 6 (LPA).

S. Single birds off Brean Down, Apr. 18, 24, May 16, 25, June 20, July 20, Sept. 27; also three, May 6. One off Steep Holm, Sept. 26. All except two were dark-phase birds. (BR).

GREAT SKUA *Stercorarius skua*

S. Single birds noted off Brean Down, Apr. 16, July 21, Aug. 1; and two, June 12, 20 (BR). One off Sand Point, Nov. 22 (TB).

LONG-TAILED SKUA *Stercorarius longicaudus*

S. One off end of Brean Down, Sept. 27, seen by BR in varying light conditions down to 50 yds. in flight and on water.

Very small, with more graceful, buoyant flight than Arctic Skuas seen same day and on 26th; deep, almost tern-like wing-beats. Slender wings; greyer and less rufous or yellowish than Arctic Skuas.

LESSER BLACK-BACKED GULL *Larus fuscus graellsii*

Winter flock of 92, Frampton Pools, Feb. 9 (LPA); 255 roosting, Chew Valley res., Feb. 18 and over 250, Dec. 12 (PJC).

HERRING GULL *Larus argentatus*

S. About 2,500 roosting, Chew Valley res., Feb. 18 (PJC). Pair bred, Church Hill, Clevedon (JFB)–a new breeding site.

COMMON GULL *Larus canus*

Passage movements to N.E. noted, April: 1,600 off New Grounds, 6th (LPA); 31 off Brean Down on 16th and 21 on 17th (BR).

ICELAND GULL *Larus glaucoides*

S. Immature at roost, Chew Valley res., Mar. 3 (PJC).

LITTLE GULL *Larus minutus*

G. Party of 14 imms. on estuary, New Grounds, June 11 (LPA).

S. Considerable spring movement—Cheddar res.: one, April 16; Chew Valley res.: three, Apr. 18; at least 17 (9 ads.), 24th; ten imms., April 25 (SBE, PLG); eight, May 2 and five on 7th (PJC, PLG). Autumn records: three juvs., Blagdon res., Sept. 3 (PJC) and two, Chew Valley res., Oct. 23 (RCP); single juvs., Cheddar res., Nov. 13 –Dec. 28 (GBB, JAMCG *et al*).

BLACK-HEADED GULL *Larus ridibundus*

S. Autumn roost counts: 2,500, Weston Bay, Aug. 11 and 3,000 Chew Valley res., on 13th (RA). Unusual record of adult with both feet missing, standing on stumps of legs, Foxhill, Bath, Nov. 15 (RMC).

Kittiwake *Rissa tridactyla*

S. Total of 353 (only 20 imms.) noted off Brean Down in watches on 19 days, Mar. 13–June 19 and one day in Sept., with max. of 115 on Mar. 13 (BR *et al.*). Sand Point: five, Jan. 24; 35, Mar. 25 and 11, June 17 (RA). Resrs.: single imms., Chew Valley, Feb. 18 (PJC) and Cheddar, Aug. 15–23 (SBE, JAMCG *et al.*).

Black Tern *Chlidonias niger*

Small spring passage, Apr. 18–June 12 but party of 42 to N. off Brean Down, May 6, and 14, Chew Valley res., same day. More prolonged autumn movements, from July 28–Nov. 4, but generally only small numbers involved. Max. counts:

	August				Sept.	
	3	18	26	29	7	8
Cheddar res.		38	10	10		
Chew Valley res.	31	11	11		20	25
Frampton				8		

White-winged Black Tern *Chlidonias leucopterus*

S. One, Cheddar res., Aug. 26 (BR, JAMCG). Record, accepted by *Brit. Birds* Rarities Committee, is tenth for Bristol district.

Caspian Tern *Hydroprogne tschegrava*

G. Adult, Frampton Pools and over estuary, Aug. 8, 11. Record, first for area, accepted by *Brit. Birds* Rarities Committee.

Descriptive notes by JGB, JDS and GAS mention large size—larger than nearby Common Gull; steady flight with shallow wing-beats; black forehead, crown and nape; light pearly-grey upperparts and white underparts; primaries with black tips and blackish under-surface; short, slightly forked tail; black legs; large, bright coral-red bill.

Common Tern *Sterna hirundo* Arctic Tern *Sterna macrura*

Fairly heavy spring passage, Apr. 16–June 26. Most records from Brean Down where 236 (to N.), May 2; 200 on 5th; 140 on 6th and 41 on 14th, but fewer thereafter. Other movements included 93 on estuary, New Grounds, Apr. 24; 49, Chew Valley res., same day; 11, Cheddar res., on 25th and 23 on 26th. Noted on 42 days, July 22–Nov. 13 with maxima of 12, Aug. 15 (of which 10 at Chew Valley), 10 on 22nd and 16 on 29th.

Roseate Tern *Sterna dougallii*

G. One, Frampton Pools, May 30 (RKB).

S. Three at rest, Chew Valley res., Apr. 24 (SBE).

Little Tern *Sterna albifrons*

G. Two on estuary, New Grounds–Frampton, May 9 (JDS); two on 31st (LPA) and one, Aug. 5 (TDE). One, Chittening, May 17

(NTL). Two, Frampton Pools, May 31 (NR) and one, June 12 (TDE).
S. Single birds, Cheddar res., Apr. 16; off Brean Down, June 2 (BR) and Chew Valley res., Sept. 8 (DW).

SANDWICH TERN *Sterna sandvicensis*
G. Single birds, Frampton Pools, Apr. 16, 17 (TDE); Chittening, July 11 (NTL) and New Grounds, Aug. 23 (LPA).
S. Reservoir records: single birds, Cheddar, Apr. 16; Blagdon, Sept. 4 and Chew Valley on 6th (PJC, PJD, BR). Off Brean Down: three, June 12; two, July 20 and four, Sept. 18 (BR). Off Sand Point: one, July 11; two. Aug. 13, and three, Sept. 16 (RA, TB).

RAZORBILL *Alca torda*
S. One off Brean Down, Apr. 3, June 12, and two, July 9 (BR). One, same place, Apr. 25 (RNC). One seen from steamer off Steep Holm, Sept. 26 (BR)—see also below.

GUILLEMOT *Uria aalge*
G. One, Aust, Oct. 31 (RDB).
S. Off Brean Down: one, May 21; up to five auks either Guillemots or Razorbills, several dates, early May–late Sept. (BR).

STOCK DOVE *Columba oenas*
Reported from 22 localities (9 in **G.**), throughout year; no large flocks. At least four pairs bred, Steep Holm.

TURTLE DOVE *Streptopelia turtur*
Reported from 27 localities (10 in **G.**), Apr. 19–Sept. 26; *c.* 3 pairs, St George's Wharf; 13, Hunstrete, July 16th.

BARN OWL *Tyto alba*
G. Single birds: Chittening to Severn Beach, Jan. 17, Feb. 8, Splatt Bridge, Aug. 5 and Hallen on 6th; Almondsbury, Nov. 21 and New Grounds, Dec. 10.
S. Pair and empty nest site, Widcombe Common, Aug. 23 (DW). Reported all months from Kewstoke, Mendip localities, resrs., Yatton, Nailsea, Portishead, Long Ashton, Leigh Woods, Pensford and Chelwood.

LITTLE OWL *Athene noctua*
G. Reported from Chittening, Oldbury, Cromhall, Sharpness, New Grounds and Fretherne.
S. Breeding reports from Westbury-sub-Mendip, Chelvey and Whitchurch (PJC, PGF, HRH). Mostly single birds recorded widely throughout the year.

SHORT-EARED OWL *Asio flammeus*

G. New Grounds: eight on stretch of sea wall, Jan 18 (MAO), present to Mar. 23, then six on 27th; single bird still there, Apr. 11 (LPA, BAP, JDS); single birds, Aug. 22, Nov. 1 with two on 15th (LPA, RB, TDE *et al.*). One, and one dead, Chittening, Feb. 19 and two there, Mar.–Apr. 27 (NTL).

S. Sand Bay: up to three, Feb. until Mar. 30 (RA, TB, TBS); one flew out to sea, Oct. 26; and one, Dec. 1 (TB). Single birds, Whitchurch, Sept. 23 (KEV), and Nailsea Moor, Dec. 30, 31 (HRH, SMT).

NIGHTJAR *Caprimulgus europaeus*

G. Female trapped and ringed, Frampton Pools, June 2 (NR).

S. Churring heard in two or three areas, Mendip (RMC).

KINGFISHER *Alcedo atthis*

G. and **S.** Seen in 38 localities, all months.

HOOPOE *Upupa epops*

G. One, Filton Golf Course, Sept. 6–16 (RA, RLB, CAP).

S. Single birds, Brean Down, May 16 (BR) and Sept. 8 (RA).

LESSER SPOTTED WOODPECKER *Dendrocopus minor*

G. Bristol records: Vassall Park (breeding probable), Frenchay Moor and Wickham Glen (BLK). One, Wildfowl Trust, Sept. (PLG).

S. Breeding season records from Blagdon res., and St. Anne's, Bristol. Other reports from North Stoke, Kelston, Backwell and Yeo Estuary.

WRYNECK *Jynx torquilla*

G. One, Cromhall, June 20 (JH).

S. Single birds, Brean Down, Sept. 14, 18 (BR) and West End, Nailsea, Sept. 15, 16 (HRH).

WOODLARK *Lullula arborea*

S. Two on passage, Middle Hope, Sept. 8 (TB).

SAND MARTIN *Riparia riparia*

Usual breeding records from St. Werburghs (**G.**) and Parson St. Station (**S.**), Bristol (PJC, PGF, BLK).

GOLDEN ORIOLE *Oriolus oriolus*

S. One seen and heard, E. margin of Chew Valley res., June 12 (GBB).

RAVEN *Corvus corax*

Reports of one or two from: **G.**—New Grounds, Whitcliff Park, Dursley area, North Nibley, Aust and Patchway; and **S.**—Rowberrow Warren, Cheddar, Priddy, Ebbor Gorge, St. George's

Wharf, Sand Point and Weston-s-Mare (where four ads., Mar. 27–RA). Pair reared four young, Brean Down.

HOODED CROW *Corvus cornix*
G. One, Chittening, Apr. 4 (JRM).

WILLOW TIT *Parus atricapillus*
S. Single birds, Berkley nr. Frome, Jan. 9 and Clutton, Jan. 10 (BR); Saltford, Mar. 14 (BK); Abbot's Pool, Apr. 28 (JFB); Stock Hill Woods, Dec. 18 (JAMCG); and Barrow res., Dec. 24 (PJC, PGF).

DIPPER *Cinclus cinclus*
Reports of single birds from: **S.**—Chew Magna, Tellisford, Monkton Combe, Midford and Bathford; and **G.**—Ford and Willsbridge (this is certainly not a true picture of the bird's status in S. Glos.).

RING OUZEL *Turdus torquatus*
S. Thirty-four, Wavering Down, Apr. 3 (NTL). Reports (17) of up to five from Nailsea, Sand Point, Brean Down and Mendip areas, Mar. 17–Apr. 12 and Aug. 24–Oct. 24.

WHEATEAR *Oenanthe oenanthe*
Reports (59, of which 16 from **G.**) of up to 14 birds from widespread localities, Mar. 14–Oct. 28.

STONECHAT *Saxicola torquata*
Widespread reports (19 in **G.**, all outside breeding season, and 47 in **S.**, all months) of up to nine birds. Breeding proved at Brean Down and old airport, Whitchurch (PGF, BR).

WHINCHAT *Saxicola rubetra*
Reports of up to five, May 2–Sept. 26, from: **G.**—Frampton on Severn, New Grounds, New Passage, Chittening and Filton; and **S.**—St. George's Wharf, Nailsea Moor, Clevedon, Sand Point, Brean Down, Charterhouse, Priddy and Chew Valley reservoir.

REDSTART *Phoenicurus phoenicurus*
Up to four reported, May 2–Sept. 26, from: **G.**—Northwick, New Passage, Almondsbury and Brentry; and **S.**—Ashton Park, Brockley Combe, Brean Down, Velvet Bottom and Priddy.

BLACK REDSTART *Phoenicurus ochrurus*
S.—Single birds, Brean Down, Jan. 23–Feb. 21 and April 17 (BR); Sand Point, Oct. 5 (TB); and Bleadon Hill, Nov. 4 (SBE).

NIGHTINGALE *Luscinia megarhyncha*
Singing males reported from: **G.**—Frampton Pools, North Nibley, Tortworth, Cromhall, Inglestone Common (Wickwar) and

Hallen; and **S.**—Leigh Woods, Midford, Warleigh Woods, Nempnett Thrubwell and Chew Stoke.

BLUETHROAT *Cyanosylvia svecica*
S. A first-winter ♂ trapped, Blagdon res., Aug. 30 (PJC, PGF). One found dead, Blackdown, Oct. 6, taken to City Museum (per RDB).

GRASSHOPPER WARBLER *Locustella naevia*
Up to three singing ♂♂ reported, April 18–Sept. 18, from: **G.**—Frampton Pools, Cromhall, Severn Beach, Chittening, Lawrence Weston, Beach, Pipley Bottom and St. Catherine; and **S.**—old airport, Whitchurch (where breeding proved), Long Ashton, Clevedon, Sand Point, Brean Down, Bleadon Hill, Winscombe Hill, Mendip Lodge, Lord's Wood, Chew Valley res. and Warleigh Woods (Bath).

AQUATIC WARBLER *Acrocephalus paludicola*
S. One, Sand Bay, Sept. 15–20, with two on 16th (CRB, PC, BR *et al.*). Record, sixth for area, accepted by *Brit. Birds* Rarities Committee.

BLACKCAP *Sylvia atricapilla*
Records of wintering birds from Sneyd Park (Bristol), Feb. 3 and 5th; Saltford, 6th; Victoria Park (Bath), 14th; and Olveston, Mar. 15.

WOOD WARBLER *Phylloscopus sibilatrix*
S. Breeding records from Leigh Woods, Brockley Combe, Rainbow Wood (Bath) and Nempnett Thrubwell. One of brood ringed, latter place, June 30 found dead, Empoli (Italy), September (PJC).

FIRECREST *Regulus ignicapillus*
Single birds: **G.**—New Grounds, Dec. 12 (APR); and **S.**—Brean Down, Oct. 24 (BR).

PIED FLYCATCHER *Muscicapa hypoleuca*
Single birds reported from: **G.**—Patchway, Aug. 20 and Filton, Sept. 24; and **S.**—Clevedon, Apr. 20, Weston Woods Apr. 21, Worlebury, Sept. 13 and Brean Down, Sept. 21.

RICHARD'S PIPIT *Anthus richardi*
S. One, Kenn Estuary, Nov. 22 and 30th, 1970 (BR). Record accepted by *Brit. Birds* Rarities Committee.

TREE PIPIT *Anthus trivialis*
Reports of up to ten, Apr. 13–Oct. 24, from: **G.**—Chittening and **S.**—St. George's Wharf, Leigh Woods, Abbot's Leigh, Failand,

Brockley Combe, Sand Point, Worlebury, Brean Down, Shipham, Mendip localities, Biddlecombe nr. W. Horrington, Marksbury and Norton Malreward (where breeding proved).

ROCK PIPIT *Anthus spinoletta petrosus*
S. Inland records of single birds from Cheddar res., Mar. 13 and Oct. 2–Dec. 24 (GBB, RMC, JAMCG *et al.*).

WATER PIPIT *Anthus spinoletta spinoletta*
S. Up to three, Cheddar and Chew Valley resrs. and Clevedon, Jan. 2–Apr. 21; up to three, Cheddar res. and single birds, Barrow Gurney res. and Portbury Wharf, Oct. 30–Dec. 28; Chew Valley res.—five, Oct. 10, then numbers rose steadily to possibly eleven (six together), Nov. 28 and at least 17, Dec. 24 (PJC, RMC, KEV *et al.*). 58 records.

WHITE WAGTAIL *Motacilla alba alba*
G. One, Severn Beach, May 11 (GY).
S. Up to nine, Sand Bay, Brean Down, and Cheddar and Chew Valley resrs., Apr. 7–May 8 (RA, TB, BR *et al.*).

WAXWING *Bombycilla garrulus*
G. Single bird, Hallen, Dec. 5 (NTL).

GREAT GREY SHRIKE *Lanius excubitor*
S. One, Rookham, nr Wells, present from Dec. 10, 1970 to Mar. 20 (many observers). One, Sand Bay, Oct. 27 (TB).

RED-BACKED SHRIKE *Lanius collurio*
G. One, Frocester, May 26 (D).
S. One, near Easton-in-Gordano, May 24 (SL, PW).

HAWFINCH *Coccothraustes coccothraustes*
Reports of up to five from: **G.**—Clifton Down, Apr.–June (NTL) and **S.**—Leigh Woods, Long Ashton, Chew Stoke, Emborough Pond and Monkton Combe, Apr. 28–end year (GBB, DP *et al.*).

SISKIN *Carduelis spinus*
G. 200, Westridge Wood, Mar. 17 (LPA). Reports of up to 60 from Frampton Pools, Snuff Mills and St. Anne's Park (Bristol), Jan. 1–Mar. 28 and Oct. 14–Dec. 31.
S. Reports (40) of up to 100 from 15 coastal and inland localities. One, ringed nr Dusseldorf, W. Germany, Aug. 6, controlled, Barrow Gurney res., Dec. 24 (PJC, PGF).

TWITE *Carduelis flavirostris*
G. One, Frampton on Severn, Aug. 19 (TDE).

S. Two, Cheddar res., Nov. 3 and 14th (GBB, JAMCG, BR) and six, Sand Bay, Nov. 10 (TB).

REDPOLL *Carduelis flammea*

Reports (85) of up to 55 birds from 22 coastal and inland localities, **G.** and **S.**, Jan. 2–May 20 and July 18–Dec. 31.

BRAMBLING *Fringilla montifringilla*

Reports of up to 20 from: **G.**—New Grounds, Aust, Chittening and Filton; and **S.**—Sand Bay and Brean Down areas and Claverton Down (Bath), Jan. 11–Mar. 4 and Oct. 17–Dec. 26 (LPA, PLG, JFR *et al.*).

CORN BUNTING *Emberiza calandra*

G. One, Frampton on Severn, June (JRH). Count of 118 singing ♂♂, Cotswolds S. of line Hawkesbury Upton–Dunkirk, early July (NJC). **S.** Several, Lansdown, July 8 (RMC).

CIRL BUNTING *Emberiza cirlus*

Up to four, Horseshoe Bend, R. Avon, Bristol (**G.**), Worlebury Hill, Cheddar res. and Draycott (GAF, JAMCG, SMT *et al.*).

ORTOLAN BUNTING *Emberiza hortulana*

S. One, Brean Down, Aug. 18 (BR)–third record for County.

SNOW BUNTING *Plectrophenax nivalis*

S. Single birds, Cheddar res., Dec. 6 and Brean Down, Dec. 7 (BR). Four, Sand Bay, Dec. 15 (TB).

TREE SPARROW *Passer montanus*

Reports of up to 40 birds from 40 **G.** and **S.** localities, with 100, Fishponds, Bristol, Feb. 11 and 300, Aust, same day.

OTHER COMMON OR REGULARLY OCCURRING SPECIES PRESENT (those marked * are mentioned in the Foreword).

Residents: Greylag Goose†, Mute Swan, Pheasant, Moorhen, Great Black-backed Gull, Woodpigeon, Collared Dove*, Tawny Owl, Green and Great Spotted Woodpeckers, Skylark, Carrion Crow, Rook, Jackdaw, Magpie, Jay; Great, Blue, Coal, Marsh and Long-tailed Tits; Nuthatch, Treecreeper, Wren*, Mistle Thrush*, Song Thrush, Blackbird, Robin, Goldcrest, Dunnock, Meadow Pipit; Pied and Grey Wagtails; Starling, Greenfinch, Goldfinch, Linnet, Bullfinch, Chaffinch, Yellowhammer, Reed Bunting, House Sparrow.

Summer or Winter visitors or passage migrants: Wigeon*, Cuckoo, Swift*, Swallow*, House Martin*; Reed, Sedge and Garden* Warblers; Whitethroat*, Lesser Whitethroat, Willow Warbler*, Chiffchaff*, Spotted Flycatcher, Yellow Wagtail*.

† Full-winged birds from the Wildfowl Trust are regularly seen elsewhere in the area.

LEPIDOPTERA NOTES
BRISTOL DISTRICT, 1971

BUTTERFLIES

By A. N. Grose

IN spite of the excellent weather experienced during the year, reports on the butterfly population, except for the more common species, have been a little disappointing. No reports have been received of the High Brown Fritillary, Duke of Burgundy Fritillary, Adonis Blue and the Small blue, all of which have previously been observed and are almost certainly still to be seen. However, the recording of the Purple Emperor in another Somerset locality is very encouraging. The Camberwell Beauty record was another notable count. It was seen and photographed near Winscombe.

Contributors were: R. Angles (RA), G. Best (GB), A. R. Brown (AB), J. F. Burton (JFB), F. Gravestock (FG), A. N. Grose (ANG), B. J. Gregory (BJG), B. L. Kington (BLK), J. Lance (JL), K. H. Poole (KHP), T. & M. Silcocks (TMS), R. Symes (RS), P. & K. Vigus (PKV) D. R. Humblett (DRH), Mrs. M. Knight (MK),

G and **S** refer to the two vice-counties of West Gloucestershire and North Somerset respectively.

Pararge aegeria (Speckled Wood)
Widespread but not numerous until early June. First seen on 29th April (TMS) at Clifton (**G.**) and recorded on Oct. 10 (RA) at Sand Point (**S.**)

Pararge megera (Wall Brown)
Seen in many localities, with an increase in numbers in August. Only common in one locality.

G. Upper Eastville: May 22 (BLK); Chittening: July 28 (BLK); Frampton Common: Aug. 16 (BJG); 1 on May 7. Charfield (MK).

S. Sandford Hill: May 14 (TMS); Weston-S-Mare: July 12 (KHP); 9 at Dolebury Camp: Aug. 24 (BLK); Numerous Clevedon: Aug. 7 (JFB).

Melanargea galathea (Marbled White)
Few records received, but common at Kingsweston Down (**G**) July 7 (ANG); Saddlewood: July 13 (MK); Wick: Few 25 July (DRH).

S. Long Ashton: 1 on July 10; Lower Failand: 1 on July 14 (ANG); Chew Valley Lake: 2 on July 21; Steart: 1 on July 29 (BLK); 3 on Brean Down: 12 July; Wavering Down: 1 on July 28 (AB).

Eumenis semele (Grayling)
Rather more this year in the few localities visited.

G. 3-Selsey Common: Aug. 16 (BJG); Bream: several July 17 (ANG).

S. Sand Point: 12 on July 28 (RA); Dolebury Camp: 3 on August 24 (BLK); Wavering Down: many on July 28 (AB).

Maniola jurtina (Meadow Brown)
A poor year for this species, only noted in numbers at a few places.

G. Coalpit Heath: Numerous July 10 (BJG); West littleton: few on July 7 (ANG).

S. Weston Woods: 1 on 13 July; Worlebury: 1 on June 24 (KHP); Abbots Leigh: 1 on June 19, 1 on July 28 (T&MS); Brockley Combe: many July 17 (JFB).

Maniola tithonus (Hedge Brown)

Fairly common in its usual haunts.

G. Kingsweston Down: common on July 7 (ANG); Stoke Park: 12 on July 28, 7 Bickley Wood, Hanham (BLK); West Littleton: several on July 7, many at Frampton Cotterell Aug 26 (BJG).

S. Biddle Combe, Wells. 1 on July 26 (FG); St. Georges Wharf: 1 on July 13; Abbots Leigh: 1 on Sept. 7; Dolebury Camp: 1 on Aug. 24 Clevedon: abundant Aug. 7 (JFB).

Coenonympha pamphilus (Small Heath).

Widespread and common.

G. Symonds Yat: May 22, several (ANG); Selsey Common, 10, Aug. 16 (BJG); Inglestone Common, abundant, June 1 (BLK).

S. Sandford Hill: 2, May 14; Charterhouse: common, July 1; St. Georges Wharf: 1, Oct. 7 (TMS); Clevedon: Numerous, May 22 (JFB).

Aphantopus hyperanthus (Ringlet)

G. Bickley Wood, Hanham: 10 on July 18; Avon Valley, Hanham: 2 on July 30 (BLK); Coalpit Heath: 1 on July 10 (BJG); Saddlewood: July 3 (MK).

S. Weston Wood: 1 on July 13 (KHP); Shapwick Heath: many July 6 (JFB); Aller Wood, Othery: Many July 9 (JFB).

Argynnis selene (Small Pearl Bordered Fritillary)

G. Forest of Dean: Several, worn, July 10 & 17 (ANG); several, with euphrosyne, early June (GB).

S. Charterhouse: 1 on July 1 (TMS); Goblin Combe: Several, June 3 (AB).

Argynnis euphrosyne (Pearl Bordered Fritillary).

G. Forest of Dean: several, early June (GB).

S. Goblin Combe: 15 on May 21 (TMS).

Euphydrias aurinia (Marsh Fritillary).

G. No record.

S. Charterhouse: 1 on July 1, May 22, 2 on June 5 (TMS).

Argynnis aglaia (Dark Green Fritillary)

G. Stoke Park: 1 on July 13 (KHP); Saddlewood: abundant July 3 (MK) and 13.

S. Weston Woods: 1 on July 20 (BLK); Brean Down: 10 on 15 July (TMS).

Argynnis paphia (Silver-Washed Fritillary)

G. Forest of Dean: Many, several localities: July 10 (ANG); Soudley (F. of D.): Aug. 25 (MK).

S. Leigh Woods: 1 on Aug. 7 (BLK); Brockley Combe: 2 on July 11; Aller Wood, Othery: 1 on July 9 (JFB).

Vanessa atalanta (Red Admiral)

Fairly common and widespread. First seen at Blakeney (**G.**) on July 14 (ANG) and the last on ivy at Abbots Leigh (**S**) on Oct. 30 (TMS).

Vanessa cardui (Painted Lady)

Rather uncommon this year and only seen in small numbers.

G. Blakeney: 1 on September 12 (ANG); Charfield: 1 on Oct. 2 (MK).

S. Sandpoint: 1 on Aug. 7; Brean Down: Sept. 8 & 12; Weston-S-Mare: Oct. 30 (RA); Clevedon: 1 on Oct. 2 (JFB); Berrow: 1 on Oct. 6 (AB).

Aglais urticae (Small Tortoiseshell)

Common and widespread. Early appearances from hibernation at Clevedon (**S**) Jan. 10 & Feb. 3 (TMS); Sneyd Park (**G**) Feb. 19 (JL). Last seen Abbots Leigh (**S**) on ivy Oct. 27 (TMS).

Nymphalis io (Peacock)

A good year for this butterfly. Early appearances Westerleigh (**G**) April 10 (BJG); Abbots Leigh (**S**) April 10 (TMS). Last seen Abbots Leigh Sept. 8 (TMS).

Polygonia C-album (Comma)

Recorded from many localities in the usual numbers.

G. Soudley, F-o-Dean: April 12 (ANG); Blakeney: April 28 (ANG); Vassals Park, Fishponds: 8 on July 20 (BLK); Frampton Cotterell: 1 on March 27 (BJG).

S. Abbots Leigh: April 10, July 12, Sept. 7, Oct. 9 (TMS); Weston in Gordano: 1 on Aug. 17 (TMS); Ashton Court: 1 on Oct. 15 (RS); Great Breach Wood, Nr. Street: 6 on Aug. 17; Warmley: numerous Sept. 7 (JFB).

Nymphalis antiopa (Camberwell Beauty)
S. Barton, Nr. Winscombe 1 (and possibly 2) July–Aug. (PKV).

Apatura iris (Purple Emperor)
S. 1 seen in a woodland locality in Somerset: August 17 (JFB).

Limenitis camilla (White Admiral)
G. Forest of Dean: single specimens on July 6, 10, 17; Dymock Wood: several on July 8 (ANG).

Aricia agestis (Brown Argus)
G. Nailsworth: 1 on June 3 (ANG).
S. Worlebury: several June 24 (KHP); Sand Point: 2 on May 18 (TMS); Dolebury Camp: 4 on Aug. 24 (BLK); Great Breach Wood: few Aug. 17 (JFB); Bathford Hill (Browns Folly) June 13 (AK).

Polyommatus icarus (Common Blue)
Widespread and common especially in Somerset.
G. Nailsworth: June 3 (ANG); Selsey Common: 6 on Aug. 16; Inglestone common: 2 on June 1; Bickley Wood: 8 on Aug. 16 (BLK).
S. Sandpoint: numerous May 12, 18, Sept. 5 (TMS); Dolebury Camp: 70 on Aug. 24 (BLK); Worlebury: several June 24 (KHP); Clevedon: many Aug. 7 (JFB).

Celastrina argiolus (Holly Blue)
Local but not uncommon, tending to increase and most evident in the first brood. 1 or 2 during early May, late July, Charfield (**G**) (MK).
G. Clifton: 2 on April 28 (TMS); Lydney Tuffs: several May 24; Symonds Yat: 1 on May 22 (ANG); Vassals Park: 1 on Aug. 5 (BLK); Highfield, Wick: few on Aug. 8 (DRH).
S. Weston-S-Mare: 1 on May 4 (KHP); Abbots Leigh: 2 on May 12 (TMS); Goblin Combe: 1 on May 21; Abbots Leigh: 1 on Aug. 2 (TMS); Clevedon: several Aug. 7 (JFB); Midford, May 2 (AK).

Lysandra coridon (Chalkhill Blue)
G. Abundant in one of the Glos. National Trust Reserves (GB).
S. Brean Down: 5 on July 24 (RA).

Lycaena phlaeas (Small Copper).
Widespread in small numbers.
G. Frampton Cotterell: 1 on Aug. 16; Aust: 1 on Aug. 24 (BJG); Bickley Wood, Hanham: 1 on June 4 (BLK); Bream: 1 on May 11 (ANG); Soudley, Forest of Dean: several, 25 Aug. (MK).
S. Sandford Hill: 1 on May 14; Sand Point: May 18; Abbots Leigh: 1 on Aug. 23 (TMS); Clevedon: many Aug. 7 (JFB); Midford: May 2 (AK).

Callophrys rubi (Green Hairstreak)
G. Symonds Yat: 1 on May 22; Bream: 1 on July 17 (ANG)—fresh, a very late date! Charfield: 1 on June 1 (MK); Avon Gorge: 1 in May (DRH).
S. Goblin Combe: 2 on May 21 (TMS), 2 on June 3 (AB).

Thecla quercus (Purple Hairstreak)
Smaller numbers this year and fewer records.
G. Forest of Dean: 3 on Aug. 16 (ANG); Avon Valley, Hanham: 30 July (BLK).
S. Great Breach Wood: a few Aug. 17 (JFB).

Strymon–W-album (White -Letter Hairstreak)
This local butterfly appears to have had a good year in spite of the impact of Dutch Elm disease on the trees.
G. Vassals Park, Fishponds: 6 on Aug. 5; Bickley Woods: 4 on Aug. 6 (BLK). Tintern Rail Track: 3 worn on Aug. 17 (ANG); Durdham Down: 2 on June 25 (AB); Charfield: 1 on July 19 (MK); Saddlewood: July 13 (MK).
S. Weston Woods: 1 on July 13 (KHP); Abbots Leigh: 1 on July 13 (TMS); Leigh Woods: 1 on Aug. 7 (BLK); Wick: 4 on Aug. 8 (DRH).

Leptidea sinapis (Wood White)
G. Symonds Yat, several May 22 (ANG).

Pieris brassicae (Large White)
Not so common this year. First reported April 22 at Weston-S-Mare (**S**) (KHP). Last seen at Abbots Leigh (**S**) Aug. 20 (TMS).

Pieris rapae (Small White)
Very common. First seen Weston-super-Mare (**S**) on April 12 (KHP), last seen Abbots Leigh (**S**): Oct. 7 (TMS).

Pieris napi (Green-Veined White)
Widespread but not abundant, first seen April 12 at Stone (**G**) (BJG), last seen Aug. 16 at Frampton Cotterell (BJG).

Anthocaris cardamines (Orange Tip)
This Butterfly appeared in the usual numbers, first seen Blakeney (**G**) April 28 (ANG); last seen June 19 at Abbots Leigh (**S**) (TMS).

Gonepteryx rhamni (Brimstone)
Widespread in suitable localities but rarely more than 2 or 3 at a time.
G. Charfield: Mar. 30, May 30, July 25 (MK); Coalpit Heath: 2 on April 10; Whitecliff Park: 8 on April 12 (BJG); Inglestone Common: 2 on June 2 (BLK); Forest of Dean: 1 on April 12 (ANG); Clifton Gorge: 1 on April 17 (RS).
S. Abbots Leigh: 3 on April 10; Goblin Combe: 1 on May 21; St. Georges Wharf: 1 on Oct. 23; Weston in Gordano: 1 on Aug. 17 (TMS); Great Breach Wood: both sexes very numerous Aug. 17 (JFB).

Erynnis tages (Dingy Skipper)
G. Nailsworth: 3 on June 3 (ANG).
S. Sandford Hill: 4 on May 14, Goblin Combe: 3 on May 21 (TMS); Bathford Hill, Browns Folly: June 13 (AK).

Pyrgus malvae (Grizzled Skipper)
G. Blackpool Bridge: 1 on May 12; Bream: 2 on May 11 (ANG); Saddlewood: July 3, July 13 (MK).
S. Sandford Hill: 2 on May 14, 1 on May 27; Goblin Combe: 4 on May 21 (TMS).

Thymelicus sylvestris (Small Skipper)
Widespread and common.
G. Earliest date—June 27 at West Littleton (BJG); most records between July 10–20.
S. Brockley Combe: few July 17; Gt. Breach Wood: many on Aug. 17 (JFB).

Ochlodes venata (Large Skipper)
Fairly common, probably increasing.
G. Saddlewood: July 3 and 13 (MK); Kingsweston Down: several July 7 (ANG); Vassals Park, Fishponds: 1 on Aug. 5 (BLK);
S. Abbots Leigh: 1 on July 12; Lower Failand: 1 on July 14 (TMS); Shapwick Heath: many July 6 (JFB); Bathford Hill: June 13.

MOTHS

By K. H. Poole

THE following list has been compiled from records received from C. S. H. Blathwayt (CSHB), J. F. Burton (JFB), T. Hall (TH), A. Kennard (AK), M. L. Knight (MLK), K. H. Poole (KHP), T. B. Silcocks (TBS) and T. B. Tunstall (TBT). An extensive list of records for the Michael Wood—Charfield—Wotton-under-Edge area, contributed by P. F. Alfrey (PFA) has been included in full as this district has not previously figured greatly in the Notes. Unless marked * all were noted at light, and were single specimens except where shown otherwise.

Some records for previous years, received lately, are also included.

Mimas tiliae L. (Lime Hawkmoth), June 18 (PFA).

Acherontia atropos L. (Death's-head Hawkmoth), Congresbury, Aug. 28 (TBT).

Herse convolvuli L. (Convolvulous Hawkmoth), Saltford, Sept. 19, 1970 (AK).

Deilephila porcellus L. (Small Elephant Hawkmoth), June 19 (PFA).

Cerura hermelina Goeze (Poplar Kitten), Weston-s-Mare, June 23 (KHP).

Cerura furcula C2. (Sallow Kitten), Abbots Leigh, Aug. 8 (TBS).

Notodonta dromedarius L. (Iron Prominent), Sept. 9 (PFA).

N. ziczac L. (Pebble Prominent), July 4 (PFA).

Pterostoma palpina C2. (Pale Prominent), May, June, Sept., several (PFA).

Lophopteryx capucina L. (Coxcomb Prominent), May 12 (PFA).

Clostera curtula L. (Chocolate Tip), Saltford, May 21, 1969 (AK).

Thyatira batis L. (Peach Blossom), May, June, several (PFA).

Leucoma salicis L. (White Satin), Shapwick, July 2, several (CSHB), Abbots Leigh, July 10 (TBS).

Dasychira pudibunda L. (Pale Tussock), June 11 (PFA).

Lymantria monacha L. (Black Arches), Aug. 4, 9, several (PFA), Abbots Leigh, Aug. 21 (TBS).

Trichiura crataegi L. (Pale Oak Eggar), Aug. (PFA), Shapwick, Sept. 3, 10, common (CSHB)

Gastropacha quercifolia L. (Lappet), July 20, 23 (PFA).

Drepana falcataria L. (Pebble Hooktip), June, several (PFA).

D. binaria Hufn. (Oak Hooktip), July 30 (PFA), Saltford, May 12, 1970 (AK).

D. cultraria Fab. (Barred Hooktip), May 22 (PFA).

Phragmatobia fuliginosa L. (Ruby Tiger), July, Aug. several (PFA).

Arctia villica L. (Cream-spot Tiger), June 8, 1970 (PFA).

Panaxia dominula L. (Scarlet Tiger), July 7, 1970 (PFA).

Cybosia mesomella L. (Four-dotted Footman), June 28 (PFA).

Nudaria mundana L. (Muslin Footman), July 24 (PFA).

Colocasia coryli L. (Nut-tree Tussock), Aug., Sept. (PFA).

Apatele alni L. (Alder Dagger), Saltford, June 1, 1970 (AK).

Euxoa nigricans L. (Garden Dart), Weston-s-Mare, late July, early Aug., several (CSHB), Milton, Weston-s-Mare, Aug. 12 (KHP)

Amathes agathina Dup. (Heath Rustic), Shapwick, Aug. 20, Sept. 10 (CSHB).

A. glareosa Esp. (Autumnal Rustic), Sept. 10* (PFA), Saltford, Sept. 23, 1970 (AK).

Anaplectoides prasina Schiff. (Green Arches), Saltford, July 28, 1969 (AK).

Hadena genistae Borkh. (Light Brocade), June 21 (PFA).

H. suasa Schiff. (Dog's Tooth), Shapwick, Aug. 20 (CSHB).

Bombycia viminalis Fab. (Minor Shoulder-knot), Aug. 2 (PFA).

Eremobia ochroleuca Schiff. (Dusky Sallow), Aug. 6, 1970 (PFA).

Episoma caeruleocephala L. (Figure of Eight), Clevedon, June 7. larva* (JFB).

Aporophila nigra Haw. (Black Rustic), Sept. 27* (PFA).

Antitype flavicincta Schiff. (Large Ranunculus), Oct. 1 (PFA).

A. chi L. (Grey Chi), Aug. 15*, Sept. 15* (PFA), Abbots Leigh, Aug. 21 (TBS).

Griposia aprilina L. (Merveille du Jour), Saltford, Oct. 22, 1969, 2 (AK).

Apamea scolapacina Esp. (Slender Brindle), July 29, 31 (PFA).

Celaena leucostigma Hb. (The Crescent), Ashcott, Aug. 31, 1969 (AK).

Cosmia pyralina Schiff. (Lunar-spotted Pinion), Weston-s-Mare, July 10 (CSHB). July 29, Milton, Weston-s-Mare (KHP).

Zenobia subtusa Schiff. (The Olive), Weston-s-Mare, July 29 (KHP).

Cerastis rubricosa Schiff. (Red Chestnut), May 11 (PFA).

Orthosia advena Schiff. (Northern Drab), Saltford, May 8, 1970 (AK).

Tiliacea aurago Schiff. (Barred Sallow), Oct. 3 (PFA).

Conistra vaccinii L. (The Chestnut), Jan. 20*, March 12*, Oct. 11* (PFA).

C. ligula Esp. (Dark Chestnut), Nov. 18 (PFA).

Lithophane semibrunnea Haw. (Tawny Pinion), Saltford, Oct. 3, 1969* (AK).

L. leautieri Boisd. (Blair's Pinion), Milton, Weston-s-Mare, Oct. 11 (KHP).

Xylena vetusta Hb. (Red swordgrass), Sept. 29 (PFA).

Heliothis armigera Hb. (Scarce Bordered Straw), Saltford, Sept. 27, 1970 (AK).

Jaspidia fasciana L. (Marbled White Spot), July, several (PFA).

Plusia festucae L. (Gold Spot), Aug. several (PFA), Abbots Leigh, Aug. 21, 24 (4) (TBS).

P. iota L (Plain Golden Y), July 27 (PFA).

P. pulchrina Haw. (Beautiful Golden Y), May 5, June 24 (PFA).

Catocala nupta L. (Red Underwing), Saltford, Aug. 29 (AK), Charfield, Sept. 4* (MLK), Weston-s-Mare, Sept. 20* (KHP).

Schrankia costaestrigalis Steph. (Pinion-streaked Snout), Sept. 29 (PFA).

Geometra papilionaria L. (Large Emerald), July, several (PFA).

Comibaena pustulata Hufn. (Blotched Emerald), July 4 (PFA).

Cosymbia punctaria L. (Maiden's Blush), July 19 (PFA).

Odezia atrata L. (Chimney Sweeper), July 7 (PFA), Saddlewood, July, Aug., abundant* (MLK).

Larentia clavaria Haw. (Mallow), Sept. 28 (PFA).

Acasis viretata Hb. (Yellow-barred Brindle) Aug. 8 (PFA).

Lampropteryx suffumata Schiff. (Water Carpet), Cheddar Gorge, May 5, 1969* (AK).

L. otregiata Metcalfe (Metcalfe's Carpet), Shapwick, June 2, several, Aug. 20, Sept. 3 (CSHB).

Perizoma affinitata Steph. (Rivulet), June 18 (PFA).

P. albulata Schiff (Grass Rivulet), June, several (PFA).

P. alchemillata L. (Small Rivulet), July, Aug. several (PFA).

P. flavofasciata Thunb. (Sandy Carpet), June 7, 1970, June 26 (PFA).

Hydriomena impluviata Schiff. (May Highflyer), Saltford, May 21, 1969 (AK).

Eupithecia distinctaria H.–S. (Thyme Pug), July 17 (PFA).

E. expallidata Guen (Bleached Pug), Saltford, July 31, 1969 (AK).

E. absinthiata C2. (Wormwood Pug), July 25 (PFA).

E. tripunctaria H.–S. (White-spotted Pug), June 29 (PFA).

E. succenturiata L. (Bordered Pug), July, several (PFA).

E. pygmaeta Hubn. (Marsh Pug), Shapwick, June 4* (CSHB).

Gymnoscelis pumilata Hb. (Double-striped Pug), Aug. 8 (PFA).

Nycterosea obstipata Fab. (Gem), Saltford, Aug. 29, Oct. 22 (2) 1969 (AK).

Anagoga pulveraria L. (Barred Umber), Cheddar Gorge, May 12, 1969* (AK).

Gonodontis bidentata Cl. (Scalloped Hazel), May 30 (PFA).

Angerona prunaria L. (Orange Moth), Shapwick, July 2, several (CSHB).

Chiasma clathrata L. (Latticed Heath), Clevedon, Aug. 11 (JFB).

Ectropis consonaria Hb. (Square Spot), Weston-super-Mare, June 7 (CSHB).

Zygaena lonicerae Schev. (Narrow-bordered Five-spot Burnet), Clevedon (JFB).

Cossus cossus L. (Goat Moth), Kingswood, Bristol, Oct., larva (TH).

Spechia bembeciformis Hb. (Lunar Hornet Moth), Easton-in-Gordano, July 15* (At rest on mist-net) (TBS).

COLEOPTERA (BEETLES)

CONTRIBUTED BY R. LYMES

Hylotrupes bajalus (House Longhorn Beetle), Coombe Dingle, larvae in wood block floor. Identified by Forest Products Research Laboratory. Apparently uncommon on this side of the country.

ODONATA (DRAGONFLIES)

Contributed by J. M. Boyd

Agrion virgo L. (Demoiselle Agrion), Sutton, Castle Cary, July 18, numerous.

Platynemis pennipes Pallas (White-legged Damselfly), Chilton Moor, May 22, (1 female *lactea*), Avon-Kennet Canal, Bathampton, July 31, 2 males.

Enallagma cyathigerum Charpentier (Common Blue Damselfly), Blagdon Reservoir, Charterhouse, Avon-Kennet Canal, colonies, May 22–Oct. 6.

Coenagrion pulchellum Van der Linden (Variable Coenagrion), Chilton Moor, May 23, July 25, Stoke Moor, small numbers.

Aeshna cyanea Müller (Southern Aeshna), Shipham, 1, Westhay Heath, 1, Chilton Moor, 2, July 25, Yatton, 1, Sept. 5.

A. grandis L. (Brown Aeshna), Avon-Kennet Canal, Bathampton, 12, July 29–Aug. 17, St. Michael's Hill, Bristol, 1, Aug. 16.

A. mixta Latr. (Scarce Aeshna), Colonies at Blagdon and Chew Valley Reservoirs, Sedgemoor, Avon-Kennet Canal. Individuals, Yatton, Draycott, Kingston Seymour, Westhay Heath, Aug. 15–Oct. 17.

Sympetrum striolatum Charpentier (Common Sympetrum), Blagdon Reservoir, Congresbury, Draycott, Westhay Moor, Sedgemoor, Avon-Kennet Canal, July 31–Oct. 23.

Agrion splendens Harris, *Lestes sponsa* Hanseman, *Pyrrhosoma nymphula* Sulzer, *Ishnura elegans* Van der Linden, *Coenagrion puella* L., *Brachytron pratense* Müller, *Libellula quadrimaculata* L., *L. depressa* L., and *Sympetrum sanguineum* Müller were again recorded for the same areas as 1970.

BRISTOL MAMMAL REPORT, 1971

By R. G. Symes

SINCE 1965 the Mammal Section's survey work has been aimed primarily at recording the presence of mammals on the basis of 10 km. squares of the National Grid for the Mammal Society's distribution scheme. Provisional maps, showing records from pre-1900, 1900 to 1959, and 1960 to 1970 by different symbols, were published by Corbet (1971). They showed the Bristol district to be well covered for most of the commoner species but emphasised how both nationally and locally the distribution of some species is poorly recorded. However the maps, which are the first detailed ones ever published for most species, give a basis for all future recording and areas needing special attention can be readily identified. Where a species has been recorded from all of the 10 km. squares in the Bristol district this is noted in the list below, but for other species new 10 km. square records, representing additions to the Mammal Society maps, are mentioned.

The Mammal Section's records are plotted on 1 km. square distribution maps so as to give more detailed information for this area. The total number of complete and partial 1 km. squares involved is approximately 2,220 and the most-recorded species, the mole, has been plotted in 428 to date, so a great deal of work remains.

The Section's field work during 1971 did not include much small mammal trapping but was concerned mostly with searching for field signs of the larger species. The three river survey meetings (see Secretary's Report p. 91) were very successful and introduced the concept of simultaneous surveys by a number of groups, each with an experienced leader. This enabled the area covered by the meetings to be increased substantially. These meetings were the basis of the groundwork necessary for investigations in progress into the status of the otter in this area, information which is urgently required. Perhaps the most important event of the year however was the reappearance in the Bristol district of the polecat after an absence of at least 43 years.

Contributors of records were:—J. Bainbridge, Mrs. M. Bambridge, G. H. Barge, R. Bassindale, K. T. Batty, J. M. Boyd, Miss S. Brindle, *Bristol Evening Post*, F. J. Bryant, J. F. Burton, Mrs. Campbell, K. J. Coghill, M. Collins, R. M. Curber, C. J. Dallinger, M. J. D'Oyly, Miss J. D. Ethelston, Mrs. A. Freeman, Miss I. F. Gravestock, Miss P. M. Hall, H. R. Hammacott, R. Hanham, M. J. Hannagan, B. S. F. Hessey, H. G. Hockey, D. J. Hughes, Mrs. N. P. Humphris, G. Jackson, A. F. Jayne, Mrs. R. E. Knight, Miss E. J. Lenton, Mrs. B. Magill, Mammal Section Field Meeting, Mrs. L. Moore, G. Moysey, *North Somerset*

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Check list numbers and names are taken from Corbet (1964).

1. HEDGEHOG. *Erinaceus europaeus.* The impression, based solely on numbers killed on roads, was that there were fewer hedgehogs about in 1971 than 1970. It was unusual, compared with previous years, to drive 100 miles in mid-June and see no dead hedgehogs when at least 3 or 4 had been expected. During a drive of 120 miles in mid-May one was found dead. A national Sunday paper (Sept. 12) also reported a shortage of hedgehogs: they had been sold as pets in a London store in 1970 for 70 pence each, but in 1971 they cost £1·50, a reflection of the supplier's problem.

Three hedgehogs born in August 1970 emerged from hibernation in a summerhouse on 17 April (PHR). A juvenile was active at 13.20 BST on 21 July (RGS), and a nest with three half-grown young was found on 17 September under an outhouse floor (HRH). One seen regularly during the summer was last seen on 3 November (MB) but others were seen throughout the unusually mild December. A female found dead on the road at Clevedon on 4 December (JDE) was later skinned and found to have accumulated no fat on the body at all. Hedgehogs have been recorded from all 10 km. squares in the Bristol district.

2. MOLE. *Talpa europaea.* A male trapped on 9 June was probably still undergoing its spring moult. Dark pigment on the flesh side of the skin, indicating areas of new growth, covered most of the dorsal surface except the middle of the back. The Mammal Society maps omitted records from ST36 but in fact, moles have been recorded from all Bristol district 10 km. squares. The inner limits of the mole's distribution in the City of Bristol appear to be bounded north of the River Avon by King's Weston Hill, Blaise Estate, Cribbs Causeway, Filton, Oldbury Court and Conham, and south of the river by St. Annes, Brislington, Whitchurch, Dundry and Ashton Park. This physical restriction of suburbia on the mole is revealed on a 1 km. grid but lost on a 10 km. basis.

3. COMMON SHREW. *Sorex araneus.* Once again the value of examining discarded bottles for remains of small mammals was shown for this and other species. Because of the likelihood of vandalism, traps were not set on the Mammal Section's survey of the Bristol Frome (FHR) but bottles provided useful records. Also recorded from Nailsea (HRH), Cromhall (NPH), Avon Gorge (FHR) and near Priddy (EJL) the last being a new 10 km. square record for ST54.

4. PYGMY SHREW. *Sorex minutus.* Skulls found in bottles on banks of Bristol Frome (MSFM) and in Avon Gorge (FHR) and one trapped in garage at Nailsea (HRH). There have been very few records from Gloucestershire since 1965.

5. WATER SHREW. *Neomys fodiens.* Trapped in a flap-trap at Winterbourne (AFJ), caught by a cat at Bath (JB), skull found in barn owl pellet at Mark (EJL) and seen alive at Compton Dando, Littleton (MS), and Lower Marston, Frome (MSFM). The last two are new 10 km. square records for ST59 and 74 respectively.

8. GREATER HORSESHOE BAT. *Rhinolophus ferrumequinum.* An adult male found dead on Clifton Down in February (PAY) had been ringed by R. D. Ransome in 1967 and had been 'refound' at Banwell in October and December 1967, and October 1968. It would have been 5 – 6 years old at death. M. Collins has continued to ring this species in Mendip caves.

11. WHISKERED BAT. *Myotis mystacinus.* One was caught in a mist net at Abbots' Leigh on 30 September (TBS).

19. PIPISTRELLE. *Pipistrellus pipistrellus.* A male was captured whilst climbing up the side of an office building at Westbury-on-Trym on 19 April at 15.30 BST during warm, sunny weather (RGS). A bat had been seen on that wall during daytime in the previous week also.

21. COMMON LONG-EARED BAT. *Plecotus auritus.* Single specimens found dead at Stapleton in a church steeple (Mrs. C., RGS), at Saltford (EJL – ident. R. E. Stebbings), and at Hawkesbury Common (MJD). These are new 10 km. square records for ST 67, 66 and 78 respectively. Critical identification of this species is essential in view of the possibility of the occurrence of the grey long-eared bat *P. austriacus* (sp. no. 22) which has been recorded in Dorset.

24. FOX. *Vulpes vulpes.* The annual Fox Rally on 7 February resulted in 16 sightings of foxes, mainly around the Downs, between 0400 and 0600 British Summer Time (MSFM). Foxes were heard calling in north-west Bristol at midnight BST on 27 January (IFG) and 0400 BST on 21 October (JGP). Four cubs were raised in an earth near Bath, two were observed suckling from the standing vixen on 11 May (EJL). Three cubs were seen outside an earth at Nailsea on 19 July (HRH), and a litter was raised in a garden at Clifton. Earths were reported in a disused boiler pipe duct at Brislington (FJB), in the grounds of a Bristol University Hall of Residence, and five were found along the banks of the Bristol Frome (MSFM). A fox was killed by a train near Clifton Down (FHR) and

one caused a driver to swerve and crash his car at Downend. One was dozing in the sun on a ledge 50 ft. down the Avon Gorge (JFB) and a police inspector reported seeing 7 around the Downs between 02.45 and 04.30 BST on 27 July (BEP). Other sightings by a number of people included two foxes which entered a garden together at Henleaze at 09.30 BST on 9 January (JGP), and two together on Kenn Moor at 12.25 BST on 23 January when the male attempted to mount the female (HRH). The headless body of a cat thought to have been killed by a fox was found at Westbury (MW) and a fox was seen carrying off a guinea pig from a garden at Blaise Dell (KJC). The Mammal Society maps omitted 10 km. square records from ST 46, 47 and 55.

27. STOAT. *Mustela erminea.* One seen alive on banks of River Brue (ST 34) and one found dead near R. Axe (ST 35) were new 10 km. square records (MSFM). One running on the mud beside Chew Valley Lake (RMC) was chased by two moorhens!

28. WEASEL. *Mustela nivalis.* Six records from Nailsea area (HRH) and one each from North Stoke (EJL), Sand Bay (RMC), Horton (REK), Dursley (MAO) and Boxwell (MJD). The last three are new 10 km. square records for ST 78, 79 and 89 respectively.

29. POLECAT. *Mustela putorius.* Walton (1968) recorded polecats from Gloucestershire near Newent (SO 72), and just in Monmouthshire near Tintern (SO 50). These were recorded between 1959 and 1962. The most recent records from the Bristol district which can be regarded with any reliability appear to be that in Tetley (1941) of one killed about 1928 in Cheddar Gorge, and that in Tucker (1925) of one shot near Harptree about 1912. The only recent record from the Gloucestershire side seems to be doubtful, one identified from about 50 yards in 1933 near Wotton-under-Edge (Tetley 1941). During April 1971 a polecat was killed at Tortworth as it was leaving a conifer plantation near a lake (GAT). The skin and skull were examined by Dr. G. B. Corbet who confirmed the identification, and they have now been deposited in the collection of the Bristol City Museum. As the species has been spreading in Wales in recent years (Walton 1968) further records would seem likely. Identification of this species is very critical as it is difficult to separate from a feral domesticated polecat-ferret, a specimen of which was killed on waste ground at Westbury-on-Trym after having been handled by several people during the previous three days (RGS). The polecat record is a new 10 km. square record for ST 69.

30. AMERICAN MINK. *Mustela vison.* Recorded in Gloucestershire on Little Avon and in Somerset at Nailsea Ponds (MJH), at

Kingston Seymour where a specimen was found decapitated (MS), at Nailsea Moor (HRH), and on Rivers Brue and Huntspill (MSFM). The Little Avon, and the last three Somerset records are new 10 km. square records for ST 69, 47, 44 and 34 respectively. The Mammal Society maps omitted a record for ST 56.

31. BADGER. *Meles meles.* A number of successful watches were held during April and May (AFJ, MSFM). The Mammal Section now has records of over 160 setts in South Gloucestershire and 74 in North Somerset. The most complete information is available for ST 68 where over 50 setts are known. 3 cubs dug out of a sett near Wells on 20 February were reported to have had their eyes open, and 4 well-grown cubs were seen outside a sett at North Stoke on 13 May. A number of reports were received of dead badgers, mostly killed on roads, but one found at Westbury-on-Trym (RGS) and two near Weston-Super-Mare (JBW) had been snared, the wires inflicting deep wounds in the bodies. Badgers in Bristol were reported to have eaten strawberries in a garden at Stoke Bishop and caused damage to fences at St. George. Badgers have been recorded from all 10 km. squares in the Bristol district.

32. OTTER. *Lutra lutra.* Stephens (1957) estimated that otters were numerous in the Somerset River Board Area and scarce in the Bristol Avon R.B.A. The Mammal Society map has recent records from only two 10 km. squares in the Bristol district and one pre-1960 record. In 1968 the Council for Nature and the Fauna Preservation Society asked the Mammal Society to investigate the status of the otter in view of the widespread belief that, especially in the south of England, numbers had declined seriously. Their interim report (*Oryx* **10**, 16 – 22, May 1969) based largely on returns from otter hunts, concluded that in the area including the Bristol district the otter population was stationary with a slight increase shown in some parts of the Avon and a slight decrease in others.

The Mammal Section had been unable to contribute much information on the otter's status and active measures were taken in 1971 to rectify the situation. A weekend training course on identification of otter traces was held in Devon and members benefited greatly from the expert tuition of H. G. and Elaine Hurrell, Graham Moysey, and Nicholas and George Barbour. Subsequently surveys were conducted along substantial stretches of the Rivers Frome, Axe, Brue and Huntspill, largely with a view to noting likely sites for otter evidence such as spraints and tracks (MSFM). Partial surveys were also undertaken by individuals (EJL, JBW, RGS) on other rivers in the area and survey meetings will be held along these in the future. A useful list of likely check-points is accumulating and when completed it will be possible to survey entire stretches of several rivers in one day and so produce a more authoritative statement on the status of the otter in the Bristol district.

34. GREY SEAL. *Halichoerus grypus*. One was seen on the shore on 24 October at Weston-Super-Mare (JBW) and a photograph was published in the local paper (NSM). This was a new non-breeding record for ST 36. A similar record for ST 35 was omitted from the Mammal Society map.

45. ROE-DEER. *Capreolus capreolus*. Slots and droppings recorded at Frances Plantation (EJL, JBW) and Rowberrow (EJL, MSFM). The Mammal Society map omitted previous records from ST 45 and 46.

48. CHINESE WATER DEER. *Hydropotes inermis*. A deer sighted at Filton (DJH *per* AFJ) was thought to be this species but there has been no confirmation. Whilst an escape from a private collection cannot be ruled out it is thought more likely that this could have been Chinese muntjac *Muntiacus reevesi* (sp. no. 47) which has been previously reported in the Bristol district (Symes, 1971).

53. BROWN HARE. *Lepus capensis*. Mr. J. M. Boyd, Joint Master of the Clifton Foot Harriers, considered that hares were scarcer in 1971 than in 1970, and that they were only found in numbers where there were arable crops, including roots and kale. Most records were from north-west Somerset, also Littleton, Corston, Wickwar, North Stoke and Priddy.

55. RABBIT. *Oryctolagus cuniculus*. Rabbits have been recorded from all 10 km. squares in the Bristol district. One adult and five young were seen in May in a lane at Over (GJ). Myxomatosis was reported in Gloucestershire at Filton, Cribbs Causeway, Aust, Olveston, Avonmouth, Bristol, Westerleigh, Cam, Cromhall and Tortworth during the year.

56. RED SQUIRREL. *Sciurus vulgaris*. During 1971 Field Officers of the Ministry of Agriculture, Fisheries and Food surveyed all the parishes in the 10 km. squares where red squirrels were recorded during the last national survey, reported by Lloyd (1962). They also included parishes in the adjoining 10 km. squares. No red squirrels were recorded in the Bristol district.

57. GREY SQUIRREL. *Sciurus carolinensis*. Recorded in all 10 km. squares in the Bristol area. Reports were received from a number of localities in Bristol including Snuff Mills where a group of 12 – 20 was seen in February (HGH). At Friary Wood, Bath on

11 September grey squirrels were found to be feeding on unripe hazel nuts and quantities of wheat from an adjoining field (EJL).

62. WOOD-MOUSE. *Apodemus sylvaticus*. Skulls found in bottles at Leigh Woods (RS), on banks of Bristol Frome (MSFM) and Avon Gorge (FHR). 6 were trapped at Ashton Court (FHR, MSFM), 9 at Cromhall (NPH) and 13 at Friary Wood (EJL), this last locality being a new 10 km. record for ST 75. An adult and five naked, blind young were forked out of a nest in a compost heap on 18 April at Nailsea (HRH). The Mammal Society map omitted records from ST 47, 74 and 76.

63. YELLOW-NECKED MOUSE. *Apodemus flavicollis*. Eighteen specimens were trapped at Cromhall between 7 June and 4 October (NPH). These replace the pre-1960 record for ST 69 on the Mammal Society map. One trapped at Rowberrow (EJL, MSFM) was the only small mammal caught in 40 traps! This unusually low catch may have been due to the fact that all the traps were washed after the previous meeting, thus removing any scent which might have proved attractive. Rowe (1970) suggested that trap odour is a factor capable of influencing the likelihood of trapping success and biasing field trapping data. A record of a yellow-necked mouse trapped at Bath in 1961 (RH) is a new 10 km. square record for ST 76.

64. HOUSE-MOUSE. *Mus musculus*. Two trapped in a garage at Nailsea (HRH) were the only records received.

65. BLACK RAT. *Rattus rattus*. 9 of 11 trapped alive on Avonmouth Docks were of the *frugivorous* variety (grey-brown above, pale underneath) and 2 were *rattus* variety (black above, dark underneath). A female *frugivorous* had a litter of 8, all *frugivorous* variety. The Mammal Society map omitted a colony of more than 40 black rats which were present for several months at Yatton ST 46, and also omitted records from Sharpness SO 60.

66. BROWN RAT. *Rattus norvegicus*. Reported from Friary Wood, Kennet and Avon Canal (EJL), banks of Bristol Frome, Rivers Axe and Huntspill (MSFM). Over 120 were killed in a malting in Bristol (RGS). Brown rats have been recorded from all 10 km. squares in the Bristol district.

67. BANK-VOLE. *Clethrionomys glareolus*. Trapped and seen at Cromhall (NPH), Pipley Bottom and Friary Wood (EJL). These are new 10 km. square records for ST 69, 75 and 76 respectively.

68. WATER-VOLE. *Arvicola terrestris*. Sightings or evidence from Wellow Brook ST 75 (EJL) and Rivers Frome ST 85 (EJL), Brue, Axe, Huntspill, Bristol Frome (MSFM) and Cambrook, and Chew

Valley Lake (RMC). Remains found in heron pellet at Cleeve (JFB). Those 10 km. squares are new records.

69. FIELD-VOLE. *Microtus agrestis.* Skulls in bottles found at Avon Gorge (FHR), tunnels and piles of grass seen on edge of River Frome (MSFM) and Friary Wood, and one seen alive at Beckington (EJL). These last two are new 10 km. records for ST 75.

86. PORPOISE. *Phocoena phocoena.* Several sightings of this species off the end of Brean Down were reported (BR) . . . Two or three were seen moving up channel on 9 July, one on 21 July, four on 25 July, one on 6 August and one on 8 August. Matthews (1941) gave an account of sightings and strandings of porpoises and other marine mammals in the Bristol Channel.

Thirty species were positively recorded in the Bristol district in 1971. Those not recorded but shown as present on the Mammal Society's maps, or known from previous records include harvest-mouse, dormouse, 2 species of deer, 7 species of bats and a variety of marine mammals. It is hoped that more members of the Society will take an active interest in mammals and record the type of information contained in this report.

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OBITUARIES

DENYS D. MUNRO SMITH

DR. Munro Smith was born in Bristol in 1890, the son of Dr. George Munro Smith, a past president of the Society and, like his father, a medical practitioner. He served as a Captain in the R.A.M.C. in the First World War and was wounded and taken prisoner. In his profession he practised for forty years at Downend and then retired to live in Clifton.

His pleasure in natural history was encouraged by his father and while at Clifton College and for many years afterwards he was especially interested in birds and photography. His devotion to botany developed later, first the flowering plants and then the bryophytes. He contributed numerous records to "Bristol Botany" from 1956 onwards and his paper "Some Mosses of the Frome Valley" was published in our *Proceedings* (1965). His records are especially numerous from the eastern side of the city and the Gloucestershire country beyond it. Among his best finds were *Campanula latifolia* at Hambrook, *Epipactis palustris* at Shortwood and *Genista anglica* near Siston Common. He studied the critical groups, as notices of *Hieracium*, *Mentha* and *Rosa*, show. In 1963 he found in Oldbury Park a moss which was later determined by Dr. E. V. Watson as *Pohlia lutescens*, new to Britain.

He joined our Society in 1938. He was also a member of the Botanical Society of the British Isles (from 1955) and the British Bryological Society (from 1962). In later years he seldom attended our Society's meetings as he was troubled with deafness resulting from war wounds and in recent years had lost the sight of one eye. On 12th November, 1971 in his 82nd year he was out studying bryophytes in the Avon Gorge and fell from the cliff edge in The Gully area sustaining multiple injuries which led to his death on 1st December. He is survived by his widow and daughter: his only son predeceased him in 1969. Mrs. Munro Smith has given his collection of bryophytes to the University of Bristol.

P. J. M. NETHERCOTT.

C. B. SALTER

Mr. Clifford B. Salter, who died in February, 1971 at the age of sixty, amassed one of the most remarkable collections of fossils ever obtained from the rocks of the Bristol district. This collection, which consists of several thousand specimens, chiefly corals, brachiopods and molluscs, is from the Carboniferous Limestone (D_2 Zone) exposed in Cliff Quarry, Compton Martin, Somerset. Most of the specimens are minute shells which can only be studied under a binocular stereoscopic miscroscope. With infinite patience Mr. Salter removed the fossils from their matrix using fine needles, brushes and a home-made vibro-tool. As Dr. R. L. Batten has written "The chief reason why this fauna is in existence is the tenacity and devotion of Mr. Salter. As an avocation he has spent many years meticulously preparing this collection. He had the very good fortune, along with a keen eye, to discover that in the Cliff Quarry differential weathering had occurred along jointing and had weakened the limestone. Weathering, fortuitously, attacks the matrix first, removing much of the calcium carbonate. As it progresses, it finally destroys the fossils. However, by careful collecting he managed to get just the right stage in the process in which the matrix is soft and the fossils unharmed. The fossils are beautifully preserved and great details such as delicate growth lines are clearly displayed."

Mr. Salter understood the scientific significance of the material he collected and made it freely available for research. The major portion of the collection is now housed in the Institute of Geological Sciences (Leeds Branch) and a small portion is preserved in the City Museum, Bristol. The gastropods have been ably described by Dr. R. L. Batten of New York and form the subject of a Palaeontographical Society monograph[1]; a new crustacean, *Cyclus martinensis*, has been described by Dr. R. Goldring[2]. The remainder of the fauna still awaits description. A new gastropod genus, which was named by Dr. Batten in honour of the finder, is represented by two species, *Salterospira tabulata* and *S. plectata*.

M. L. K. CURTIS.

[1] BATTEN, R. L., 1966. The Lower Carboniferous Gastropod Fauna from the Hotwells Limestone of Compton Martin, Somerset. *Palaeontogr. Soc. London Monograph*, 109 pp., 10 pls.

[2] GOLDRING, R. 1967, *Cyclus martinensis, sp. nov.* (Crustacea) from the Upper Viséan of the Mendip Hills, England. *Palaeontology*, **10**, 317-21, pl. 51.

A NEW EXPOSURE OF THE OLD RED SANDSTONE-LOWER LIMESTONE SHALE TRANSITION AT PORTISHEAD, SOMERSET.

By M. Butler, B. P. J. Williams and R. Bradshaw
(Department of Geology, University of Bristol)

Introduction

During the excavations for a new building site at Woodhill, Portishead (ST 469 774) rocks of Old Red Sandstone – Lower Limestone Shale age were exposed in a road cutting (Fig. 1). This section includes a development of red crinoidal limestones similar to those described by Reynolds and Greenly (1923, 1924) and earlier workers, who referred them to the 'Bryozoa Bed'.

The 'Bryozoa Bed' lithology was first described by Stoddart (1861) and subsequently at Portishead by Lloyd Morgan (1886). Reynolds & Greenly (1923, p. 93; 1924, p. 453) commented on the presence of the 'Bryozoa Bed', exposed at the northern end of Woodhill Bay and in small quarries nearby, and Smith & Reynolds (1934) noted rocks of this type in a borehole on the east side of Woodhill. Its presence has also been remarked upon by Kellaway & Welch (1955).

A detailed account of this section and rocks of similar age elsewhere in the Bristol–Mendip area is currently in preparation by one of the authors (M.B.).

Description of Section

The section shows a transition from the dominantly sandstone lithologies of the Old Red Sandstone into the limestone-siltstone lithologies typical of the Lower Limestone Shale Group. A stratigraphic log and details of the sedimentary sequence are given in Figure 2.

Points of special significance are as follows:—

1. the presence of phosphatic nodules at the base of unit 3 together with the concentration of phosphatic material and the teeth and plates of fish in unit 4. These lithologies may be considered to represent 'lag' deposits, the major development of which in unit 4, together with haematitic fossil material, suggests a correlation with the 'Palate Bed' of the

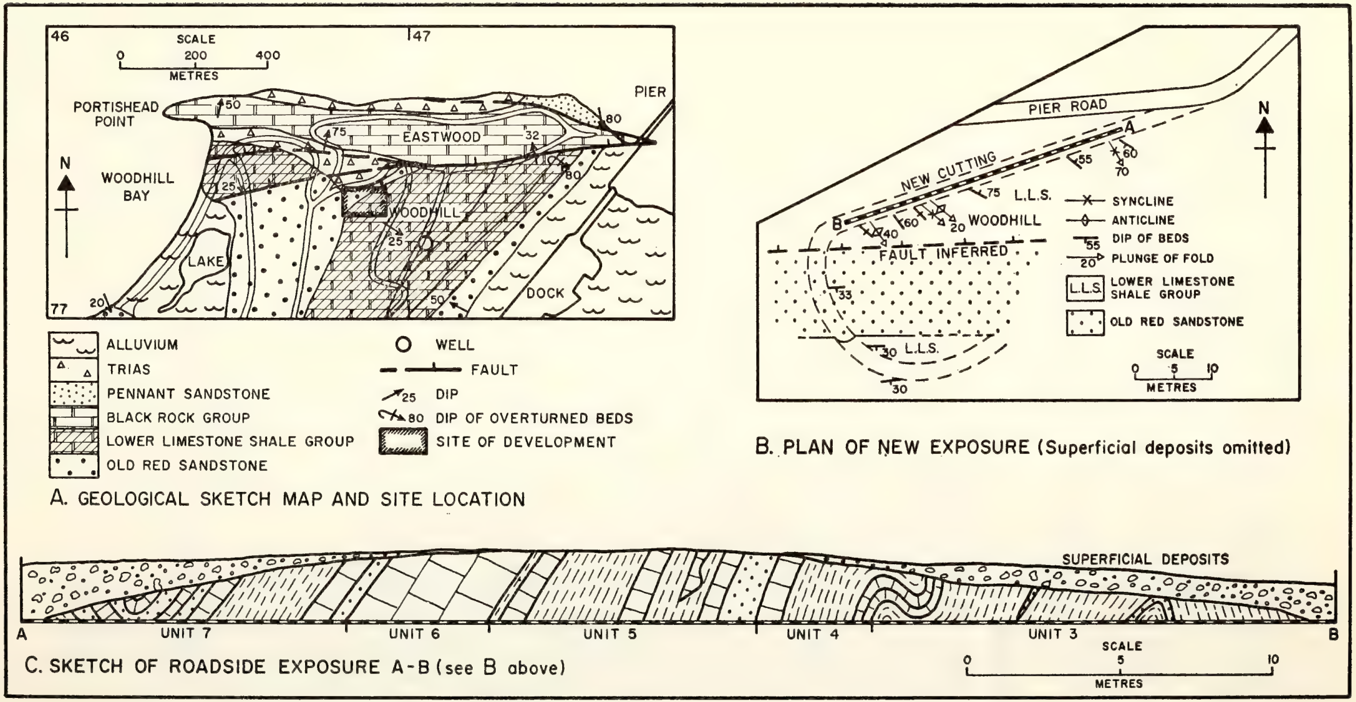
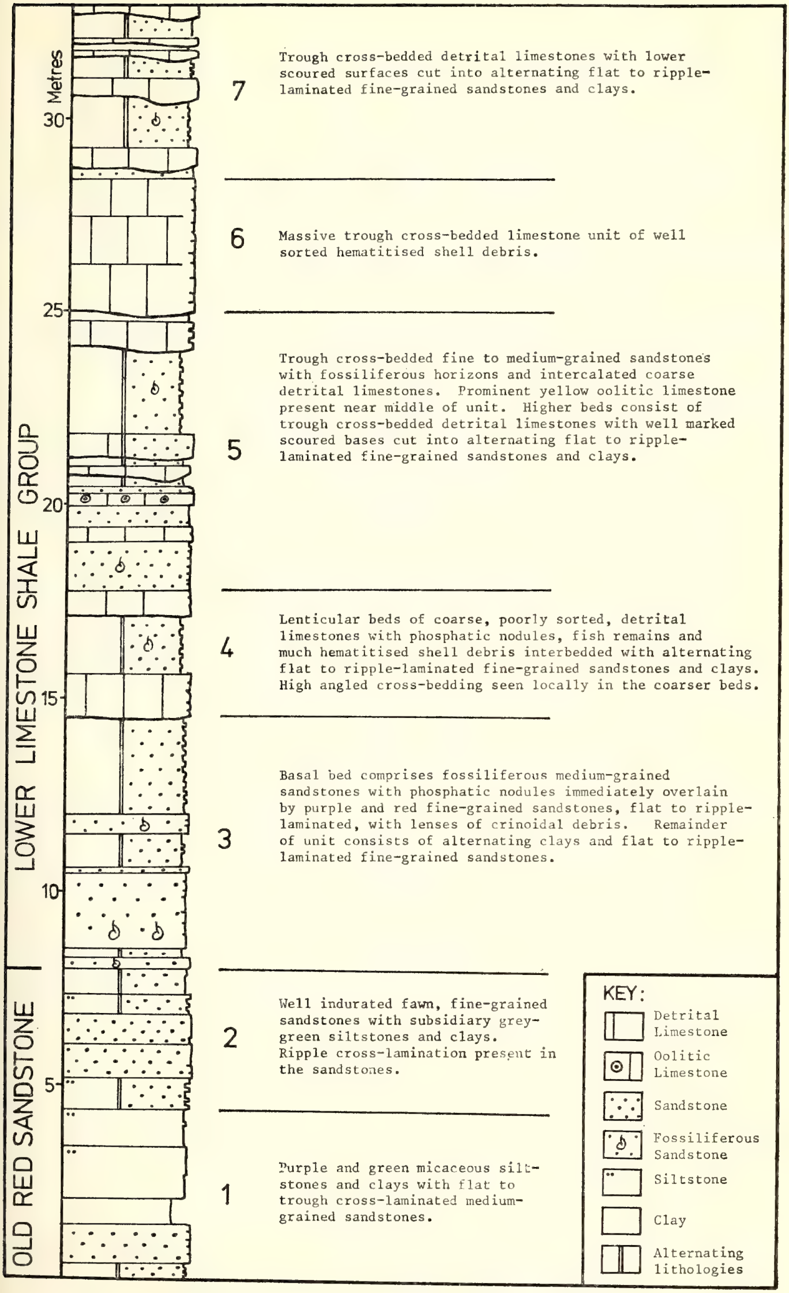

46
SCALE
0
200
400
METRES
47
PORTISHEAD POINT
PIER
WOODHILL BAY
EASTWOOD
WOODHILL
LAKE
DOCK
N
77
50
75
32
80
80
25
25
50
20
ALLUVIUM
TRIAS
PENNANT SANDSTONE
BLACK ROCK GROUP
LOWER LIMESTONE SHALE GROUP
OLD RED SANDSTONE
WELL
FAULT
25 DIP
80 DIP OF OVERTURNED BEDS
SITE OF DEVELOPMENT
A. GEOLOGICAL SKETCH MAP AND SITE LOCATION
PIER ROAD
NEW CUTTING
A
B
N
L.L.S.
WOODHILL
FAULT INFERRED
55
60
70
75
60
20
40
33
30
30
SYNCLINE
ANTICLINE
55 DIP OF BEDS
20 PLUNGE OF FOLD
L.L.S. LOWER LIMESTONE SHALE GROUP
OLD RED SANDSTONE
SCALE
0
5
10
METRES
B. PLAN OF NEW EXPOSURE (Superficial deposits omitted)
SUPERFICIAL DEPOSITS
A
UNIT 7
UNIT 6
UNIT 5
UNIT 4
UNIT 3
B
SCALE
0
5
10
METRES
C. SKETCH OF ROADSIDE EXPOSURE A-B (see B above)

Figure 1. Geological setting and details of the new exposure.


Metres
30
25
20
15
10
5
LOWER LIMESTONE SHALE GROUP
OLD RED SANDSTONE
KEY:
Detrital Limestone
Oolitic Limestone
Sandstone
Fossiliferous Sandstone
Siltstone
Clay
Alternating lithologies

7 Trough cross-bedded detrital limestones with lower scoured surfaces cut into alternating flat to ripple-laminated fine-grained sandstones and clays.

6 Massive trough cross-bedded limestone unit of well sorted hematitised shell debris.

5 Trough cross-bedded fine to medium-grained sandstones with fossiliferous horizons and intercalated coarse detrital limestones. Prominent yellow oolitic limestone present near middle of unit. Higher beds consist of trough cross-bedded detrital limestones with well marked scoured bases cut into alternating flat to ripple-laminated fine-grained sandstones and clays.

4 Lenticular beds of coarse, poorly sorted, detrital limestones with phosphatic nodules, fish remains and much hematitised shell debris interbedded with alternating flat to ripple-laminated fine-grained sandstones and clays. High angled cross-bedding seen locally in the coarser beds.

3 Basal bed comprises fossiliferous medium-grained sandstones with phosphatic nodules immediately overlain by purple and red fine-grained sandstones, flat to ripple-laminated, with lenses of crinoidal debris. Remainder of unit consists of alternating clays and flat to ripple-laminated fine-grained sandstones.

2 Well indurated fawn, fine-grained sandstones with subsidiary grey-green siltstones and clays. Ripple cross-lamination present in the sandstones.

1 Purple and green micaceous siltstones and clays with flat to trough cross-laminated medium-grained sandstones.

Figure 2. Composite stratigraphic section.

Avon Gorge. The latter has been described by Reynolds (1921) and earlier authors.

2. oolitic limestone (as in unit 5) has not previously been reported from this horizon at Portishead, although it was described from a small quarry, now filled in, at Abbot's Leigh by Coysh (1926, p. 324).
3. the massive trough cross-bedded limestones of unit 6 are very similar to beds outcropping on the foreshore, south of Battery Point, referred to by Reynolds & Greenly (1914) as the 'Bryozoa Bed'.

The overall structure of the new exposure appears to consist of an east-west trending anticline, the core of which is faulted. The northern limb of this anticline is much contorted by variably plunging (20° – 70° SE) folds (Fig. 1C), similar in style to those present in the Lower Limestone Shale Group on the foreshore at Woodhill Bay, whereas the southern limb is relatively undisturbed. The stratigraphic section (Fig. 2) is a composite one from both sides of the anticline.

Smith & Reynolds (1934) described a similar structure from a borehole approximately 300 m south-east of the present site (Fig. 1A) where relatively undisturbed Old Red Sandstone and Lower Limestone Shale were thrust over much folded rocks of the same age by a steeply hading fault. It seems likely that the new roadside exposure forms part of this same structure.

Conclusions

It is suggested that lithologies formerly referred to as the 'Bryozoa Bed' at Portishead are not stratigraphically equivalent to the classic Bryozoa Bed in the Avon Gorge, since they appear to lie above the Palate Bed horizon and not below as in the Gorge.

Information from this new exposure confirms the suggestion by Smith & Reynolds (1934) that a third east-west trending fracture occurs south of the two major faults mapped on East Wood by the Institute of Geological Sciences and recorded on their 1 : 25,000 map.

Acknowledgement

We wish to thank Mrs. A. Gregory for drafting Figure 1.

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Book Review

The Exmoor Handbook and Gazetteer. N. V. Allen, 1972., 76 pp., eight plates within text. The Exmoor Press, Dulverton Somerset. 50p.

This booklet is another addition (labelled H1) to the excellent series of informative guides and studies concerned with Exmoor which are known as Microstudies. Unlike the others it is more general but is still the work of an expert. The first section is devoted to facts and figures and information offices, museums, libraries and local papers are listed with their addresses. The landscape is given eighteen pages of description which will satisfy the requirements of many, but unfortunately no consideration is given to the geology and the paragraph on mining is meagre. History and archaeology are succinctly presented in a few pages and, inevitably, such is the popular interest, the "Doones" are given almost as much space. Wild life is treated in some detail and there is a final section on Recreation and Amenities. The Gazetteer (with National grid references provided) and a Further Reading list takes the interest onwards into greater detail and understanding. This is a welcome and useful introduction to one of Britain's magnificent National Parks.

J. W. Cowie.

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THE DIPTERA (INSECTA) OF STEEP HOLM

By K. G. V. Smith

(Department of Entomology, British Museum (Natural History) London)

Griffiths & Bartlett (1914) recorded only three species of Diptera from Steep Holm, determined by the late F. W. Edwards, F.R.S. Among the unidentified material in the collection of the late John Cowley recently bequeathed to the British Museum (Natural History) were 33 specimens of Diptera representing 19 species, of which all were new records. All species now recorded are listed below with ecological notes. The flora of the island is well known to botanists as being rather unique. Some 225 species of plants have been recorded (McLean & Hyde 1924; Skene 1939; Graham 1964, 1966), but as Chase (1971) has pointed out the flora is continually changing due to various factors including occupation by the army, periodic farming and disturbances caused by the gull and rabbit populations. Bridgewater (1971) presents a classification of the island's vegetation.

In the species list that follows the comments apply to the species in general and not particularly to its ecology on Steep Holm, though of course one would expect this to be the same. Obviously many more species await discovery on the island.

BIBIONIDAE

Dilophus febrilis (L.). 27. v. 1914 (F. G. Pearcey & N. Ward).

Recorded by Griffiths and Bartlett. The larvae sometimes occur in large numbers in soil and have often been recorded as causing damage to the roots of plants. The species has two broods appearing first in May often in large numbers when the adults are important pollinators of fruit blossom and in smaller numbers in August and September.

THEREVIDAE

Thereva nobilitata (F.) ♂ 10. vi. 1956 (J. Cowley).

One of the most frequently encountered species of the family, although none could be called common. Larvae of this species have been reported from decaying wood stumps, in earth or cow dung.

EMPIDIDAE

Empis tessellata F. ♂ 10. vi. 1956 (J. Cowley).

A common and widely distributed species which occurs in two forms, a pale legged and dark legged. The Steep Holm specimen is of the pale legged form.

The adults, in common with most Empididae, are predaceous and in this species the prey is usually small Diptera. Adults also occur on a variety of flowers. The immature stages are spent in the soil where the larvae are predaceous.

DOLICHOPODIDAE

Medetera truncorum Mg. 2♂ 10. vi. 1956 (J. Cowley).

Medetera species occur on vertical surfaces especially on tree trunks, but *M. truncorum* is common on walls and houses and has been stated to prefer them.

Laurence (1951) records the adults of this species as preying upon Psocoptera, Thysanoptera, Mycetophilidae and a small Arachnid.

The larvae of *Medetera* species have been found under bark in bark-beetle galleries (Scolytidae).

SYRPHIDAE

Syrphus ribesii (L.) ♂ 10. vi. 1956 (J. Cowley).

A common and widely distributed species usually found in flowers. The larvae are predaceous on aphids on various trees, shrubs and herbs.

Platycheirus albimanus (F.) ♂ 10. vi. 1956 (J. Cowley).

A common and widely distributed species usually found on flowers. The larvae are predaceous on aphids.

Eumerus strigatus (F.) 2♂, 1♀ 10. vi. 1956 (J. Cowley).

One of the common bulb-flies. The larvae are phytophagous and live gregariously in bulbs.

PALLOPTERIDAE

Palloptera umbellatarum F. ♀ 10. vi. 1956 (J. Cowley).

A widely distributed species recorded as breeding in the flower-heads of thistles (*Carlina vulgaris* L. on the continent and *Cirsium vulgare* (Savi) in this country).

TEPHRITIDAE (= TRYPETIDAE)

Philophylla heraclei (L.) ♂ ♀ 10. v. 1956 (J. Cowley).

This is the well known celery fly but in addition to celery it also mines the leaves of parsnips and many of the Umbelliferae, especially hogweed (*Heracleum sphondylium* L.).

LONCHAEIDAE

Lonchaea vaginalis Fallén 27. v. 1914 (G. C. Griffiths).

Recorded by Griffiths & Bartlett. The larvae have been recorded from beet-roots where they were almost certainly only secondary feeders, the roots being already diseased.

Lonchaea flavidipennis Zetterstedt 2♀ 10. vi. 1956 (J. Cowley).

This is a common species and has been reared from cultivated parsley stems (*Petroselinum crispum* Mill) in Bedfordshire and henbane stems (*Hyoscyamus niger* L.) in Hertfordshire.

PSILIDAE

Chyliza extenuata Rossi (=*atriseta* Mg.) ♂ 10. vi. 1956 (J. Cowley).

This species appears scarce. Collin (1944 : 215) records it from only Hants., Surrey, Suffolk and Co. Wicklow (Eire). In the British Museum (Natural History) there are five specimens from S. Devon (Salcombe), Wiltshire (Marlborough and Salisbury) and Hants. (Portsdown). The larvae are said to live in the swollen underground stem of the greater broomrape (*Orobanche rapum-genistae* Thuill.).

SEPSIDAE

Nemopoda nitidula (Fallén) (= *cylindrica* F.) 27. v. 1914 (F. G. Pearcey & N. Ward).

Recorded by Griffiths & Bartlett as '*Nematobia cylindrica*', presumably a misreading of F. W. Edwards' determination label, since there are many other misspellings in their paper.

Sepsidae breed in dung.

HELEOMYZIDAE

Suillia (*Helomyza*) *variegata* Loew ♂ 10. vi. 1956 (J. Cowley).

This species is usually found upon fungi, in which it breeds.

TACHINIDAE

Voria trepida Mg. ♂ 10. vi. 1956 (J. Cowley).

A common species in woods, heaths and wastes. The larvae are parasitic on various Lepidoptera, mostly Noctuidae, and the species has been recorded from the pine sawfly (*Diprion pini* L.).

RHINOPHORIDAE

Phyto melanocephala Mg. ♂ 10. vi. 1956 (J. Cowley).

This is a common species, especially on coastal wastes. The larvae are parasitic in woodlice.

SARCOPHAGIDAE

Sarcophaga subvicina Rohdendorf 2♂ 10. vi. 1956 (J. Cowley).

A very common species, generally distributed.

Sarcophaga dissimilis Mg. 2♂ 10. vi. 1956 (J. Cowley).

A common species of woods and wastes. Most *Sarcophaga* species are carrion feeders as larvae.

Sarcophaga teretirostris Pand. 2♂ 10. vi. 1956 (J. Cowley).

A common species of woods, wastes and coasts, with a fairly wide distribution.

Sarcophaga nigriventris Mg. 3♂ 10.vi. 1956 (J. Cowley).

A common species of chalk wastes and woods. It has been recorded parasitising living snails and certain insects.

CALLIPHORIDAE

Lucilia sericata Mg. 2♂, 1♀ 10. vi. 1956 (J. Cowley).

The principal sheep blowfly in Great Britain and generally distributed. Larvae are found in carrion and sometimes in the wounds of animals.

Lucilia caesar L. 3♂ 10. vi. 1956 (J. Cowley).

A very common and widely distributed species in woods, wastes and gardens.

ACKNOWLEDGEMENT

I thank Mr. C. E. Dyte for the determination of *Medetera truncorum* Mg.

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THE SPIDER FAUNA OF STEEP HOLM; Addendum

By B. J. Chase

The following list of species could not appear along with the article published last year (*Proc. Bristol Nat. Soc.*, **32** (1), 70–72), but is now presented here (Ed.):—

SPECIES LIST

Nomenclature after Locket & Milledge, 1951 and 1953.

Species	*Year found*		
	1938 [Hamilton Records]	1968	1969
ATYPIDAE			
Atypus affinis Eichwald ♀♀♀♀			X
DICTYNIDAE			
Ciniflo ferox (Walck) ♀♀			X
OONOPIDAE			
Oonors pulcher Temp. ♀♀		X	X
Oonops domesticus de Dalmas ♀			X
DYSDERIDAE			
Dysdera erythrina (walck) ♀♀	X	X	X
Dysdera crocata Koch ♀♀♀			X
Harpactea hombergi (Scop) ♀♀♀		X	X
Segestria senoculata (L.) ♀♀	X	X	X
Segestria bavarica Koch ♀♀♀		X	X
GNAPHOSIDAE			
Drassodes lapidosus (Walck) ♀♀		X	X
Zelotes latreillei (Simon) ♀			X
CLUBIONIDAE			
Clubiona stagnatilis Kulcz. ♀		X	
Clubiona terristris Westr. ♂		X	X
Phrurolithus festivus (Koch)	X		
THOMISIDAE			
Xysticus cristatus (Cl.) ♀		X	
Oxyptila blackwalli Simon ♂		X	
Philodromus aureolus var caespiticolis Walck ♀			X
SALTICIDAE			
Salticus scenicus (Cl.) ♀♀	X	X	X
Heliophanus cupreus (Walck) ♀♀♀	X		X
Neon reticulatus (Blk.)	X		
Euophrys frontalis (Walck)	X		

LYCOSIDAE			
Lycosa tarsalis Thor.	X		
Trochosa ruricola (Degeer) ♂		X	
Trochosa terricola Thor ♀♀♀♀			X
AGELENIDAE			
Tetrix denticulata (Oliv.) ♀♀		X	X
Tegenaria domesticus (Cl.) ♀ + imms.	X	X	
THERIDIIDAE			
Episinus truncatus Latr.	X		
Steatoda bipunctta (L.) ♀		X	
Theridion varians Hahn ♀			X
Theridion ovatum (Cl.) ♀			X
NESTICIDAE			
Nesticus cellulanus (Cl.) ♀		X	
TETRAGNATHIDAE			
Tetragnatha extensa (L.) ♀			X
ARGIOPIDAE			
Meta segmentata (Cl.) ♀♀♂♂		X	X
Meta menardi (Latr.) ♀♀♂	X	X	X
Araneus diadematus Cl. ♀♀♂		X	X
Araneus cornutus Cl. ♀♀♀♀		X	X
Araneus cucurbitinus Cl. ♀		X	
Zygiella x-notata (Cl.) ♀♀		X	X
Zygiella atrica (Koch) ♀♀		X	X
LINYPHIIDAE			
Gonatium rubens (Blk.) ♂		X	
Stemonyphantes lineatus (L.) sp. juv.		X	
Lepthyphantes tenuis (Blk.) ♀		X	X
Lepthyphantes mengei Kulcz ♂♂♀♀			X
Linyphia triangularis (Cl.) ♀			X

(N.B. Sexes relate to specimens of 1968 and 1969).

A PRELIMINARY STUDY OF THE OCCURRENCE OF IRON ORE AT THE NEW TRADING ESTATE, YATE

By M. T. Curtis

IN the latter half of 1971, excavations on the new Yate Trading Estate to accommodate a new sewage pipe resulted in piles of rock and debris being left on the surface. The grid reference of the find is ST696824. On examination, these spoil heaps were seen to contain fragments of rock having a yellow, ochreous appearance which was quite prominent against the red/brown background of the country rock. On closer examination, this colouration was found to be a superficial, weathered layer on brown/black iron ore. A further search produced specimens of ore without this exterior coating.

The country rock of the exposure was the Pennant Sandstone of the Coal Measures Series. The exposure was close to the unconformable junction of the Pennant and the Keuper Marl.

Most of the samples were in the form of coatings on the Pennant Sandstone and the majority of these were quite without form due to the complete infilling of the fissures in which they were laid down. On many samples, clear indications of form were to be seen where room for growth was allowed. Mammillary growth was found to be common. When these samples were broken open, a radiate structure was found within. Most of these mammillary structures were found to be grown on a cryptocrystalline substrate. Many samples showed a multiplicity of layers.

The outer surface of the ore was normally either red/brown or black and in several cases had a highly glazed finish. The radiate layers beneath the surface, and substrate below that, were grey to black in colour. In a few cases, however, when substrate material was examined more closely, small crystallites and strings of crystallites were observed. On further examination these were believed to be small voids or cracks around which the ore had an appearance similar to that described lying beneath the mammillated surfaces.

In one case where the void in the ore was about 1 mm across, small filaments were observed on the walls of the void which were similar to those found as goethite encrustations at Lambs Lair Quarry on the Mendips (Kingsbury, 1941). This feature was only seen clearly under a low power microscope.

In clear evidence was the stalactitic form of ore. These samples of ore showed both simple, single stalactites and composite sheets of stalactitic growth. The colours ranged from red/brown to black and the surface finish ranged from matt to highly glazed.

The internal structure of these specimens when broken at right angles to the vertical growth axis was found to be radiate about this axis and not concentric as is normally found in the calcitic counterpart.

Further studies of the composition of the deposits will, it is hoped, give a clearer picture of the mechanism of deposition.

One specimen was found which showed the normal mammillary deposits described above, and in addition, possessed a clear yellow crystalline deposit. Furthermore, in one void in the sample, a small deposit was found which, on microscopic examination, was seen to be an aggregate of fine yellow acicular crystals.

Compositional Studies

To date, only two samples have been analysed (Y/3/72/10 and Y/6/71/2). The first specimen is a piece of the massive ore and the second a stalactitic sample. Samples of both were powdered and subjected to X-ray diffraction in a Debye-Scherrer powder camera using Chromium K_α radiation. On analysis, the two films were found to be almost identical, showing both goethite and haematite lines, the former being the major constituent.

The films were fogged by flourescent radiation. This has been ascribed to a small amount of calcium in the sample which should not be ignored as this may be significant in identifying possible conditions under which the ore was laid down.

Theory of Origin of Deposit

Most of the samples were in the form of coatings on the Pennant Sandstone. The fact that the ore is present as a coating on the surfaces of cracks suggests a prior fissuring process. Additional evidence is shown by several samples having a brecciated appearance. Indeed, these are believed to be examples of fault breccia where phenoclasts of sandstone sit in a matrix or iron ore. No fault is shown on the Institute of Geological Sciences map for the locality.

The degradation of consecutive layers in the multi-layered specimen is believed to be either evidence of a multi-stage depositional history or a degradation of the originally laid down mineral with age. The former seems more likely as the interface between the two layers is quite clearly defined. Also the latter would indicate some kind of ageing process such as that which follows the precipitation and flocculation of a sol.

It should be noted at this point that all of the textures presented by this deposit have traditionally been assigned to a collodial origin for the ore but Roedder (1968) has shown that such textures may have other origins.

The mammillated ore may have been formed in a manner similar to that described by Roedder (1968) i.e. a number of crystals nucleate on a plane and then grow selectively depending upon their crystallographic orientation relative to the direction of flow of the ore-bearing fluid. If these crystals have a filamentary form then one may suppose that a group of these crystals may grow so that they interfere and coalesce to produce the type of pattern seen beneath the surface of the mammillated specimens.

The internal structure of the stalactitic form of ore proves to be something of a problem. The radiate structure suggests either that secondary crystallisation has occurred subsequent to deposition or that this structure represents an elongation of a single mammillary element along the vertical axis during growth.

The ore in several samples grew normally to the walls of cracks in the sandstone and where two growing surfaces met the result was a string of crystallites as described above.

The nature of the ore-bearing fluid may next be considered. This was almost certainly an aqueous solution of iron descending from the overlying Keuper Marl but its exact constitution is difficult to determine. Both goethite and haematite were found in the samples.

Weiser & Milligan (1935) found that haematite was formed when $Fe_2O_3 . x H_2O$ was aged under water, and goethite was formed on the hydrolysis of most ferric salts. However, Schwertmann (1971) found that in the pH range 3·5–7·5, $Fe_2O_3 . x H_2O$ crystallised to give a mixture of goethite and haematite and in this range, oxidation of ferric citrate gives pure goethite. So, because goethite is the predominating phase in the ore, it may be inferred that deposition occurred as a result of hydrolysis of a solution of a ferric salt though some ageing of an $Fe_2O_3 . x H_2O$ sol may have been proceeding at the same time.

Summary

Iron ore has been found at Yate and investigated with a view to the elucidation of its depositional history.

Iron ore was formerly worked at Iron Acton. Of this ore deposit, Anstie (1873) said "Just south of Iron Acton . . . a large fault

traverses the Coal Measures in a northerly direction and, where the fault crosses the Pennant, it contains a valuable lode of Haematite Iron Ore which is now being worked." This attempt to win ore was short-lived because of the difficulty involved in keeping the mines dry, and today there is no obvious evidence of the old industry.

The ore described above is believed to have been formed about the same time as the deposit at Iron Acton. It is hoped to be able to tie these two deposits more closely together and further to determine the exact depositional history of these deposits.

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Book Review

The Trees and Woods of Exmoor by R. Miles

This booklet, published at 50p by the Exmoor Press, Dulverton, is one of the series of 'Microstudies' edited by Victor Bonham-Carter, each of which deals with some facet of Exmoor, its history, wild life, archaeology or human activity. The present work does not confine itself to the National Park, but mentions also some of the notable trees and woods outside the Park boundary, though still in the Exmoor region. It also gives some account of forestry in the Quantocks.

A sense of history is fit and proper in one who practises the long-term profession of forestry. The author starts, accordingly, with sketches of the prehistory of the region and of Man's impact from his earliest coming to the present. He describes the Domesday records, and mediaeval forestry practices; also the history of the Royal Forests of Exmoor, Petherton (of which Geoffrey Chaucer was Warden from 1390 to 1400) and Quantock. Following sections deal with notable trees; with the activities of the Knights in the Simonsbath area; the making of the great private parks, like Alfoxton on Quantock, Nettlecombe and Dunster; planting activities since the end of the seventeenth century; and the effects of modern legislation and the two great wars. A conclusion describes modern developments in amenity use of forests, and looks hopefully to the future.

The author first saw Exmoor's woods from the deck of a paddle steamer as a schoolboy. He trained amongst them as an undergraduate forester, and has spent twenty-five years in the region as a professional. He is now Chief Forestry Officer and Landscape Architect with Somerset County Council's Planning Department, and has written a standard work on forestry aesthetics. His deep knowledge of, and love for, his subject are apparent throughout this little book, and make it a delight to read. His own black-and-white photographs admirably complement the text, and Audrey Bonham-Carter's line drawings of characteristic leaves, flowers and fruit are useful aids to identification. S. M. TAYLOR.

SOME GORGES OF THE BRISTOL DISTRICT

By A. B. Hawkins

INTRODUCTION

ONE of the outstanding morphological features of the Bristol District is the number of gorges. However, only that at Clifton and the two Mendip gorges of Cheddar and Burrington are well known. The purpose of this paper is to draw attention to some of the other steep-sided valleys and to discuss their origin. A brief individual description will be given of some of the gorges before an attempt is made to explain their origin. This seems opportune at the present because of the recent re-interpretation of the evidence for the glaciation of this region: some mention has already been made in the literature (Hawkins & Kellaway, 1971) and detailed descriptions are in preparation and will be published in the near future.

THE GORGES

Clifton Gorge

No lengthy morphological or geological description of the Clifton Gorge is felt necessary; it is assumed that members of the Society will know it well. Further, Bradshaw (1966) published his Geological Section Presidential Address on this topic. It is, however, thought apposite to stress a few facts and give some new ideas.

The gorge descends steeply from the almost flat surface at 270 – 300 ft. (80 – 90m.) O.D. which is probably the result of Rhaetic planation, later modified during the Tertiary. Between the Sea Walls and Hotwells, the N.N.W. – S.S.E. gorge is almost straight, with any divergence probably being associated with the post-Keuper jointing (Hawkins & Kellaway 1971, p. 281). In the floor of the gorge the rock reefs of the intertidal zone, though partly modified to facilitate navigation, give a different morphological expression from the steep craggy slopes above the Portway, and stress that many of the almost vertical faces are not natural, but result from quarrying and road/rail excavations. The rock floor of the gorge lies well beneath the alluvium, the maximum depth at the Hotwells Waterworks tunnel (ST 566725) being −39·3 ft. (−12m.) O. D. (Hawkins 1962, p. 370) and is probably even deeper downstream.

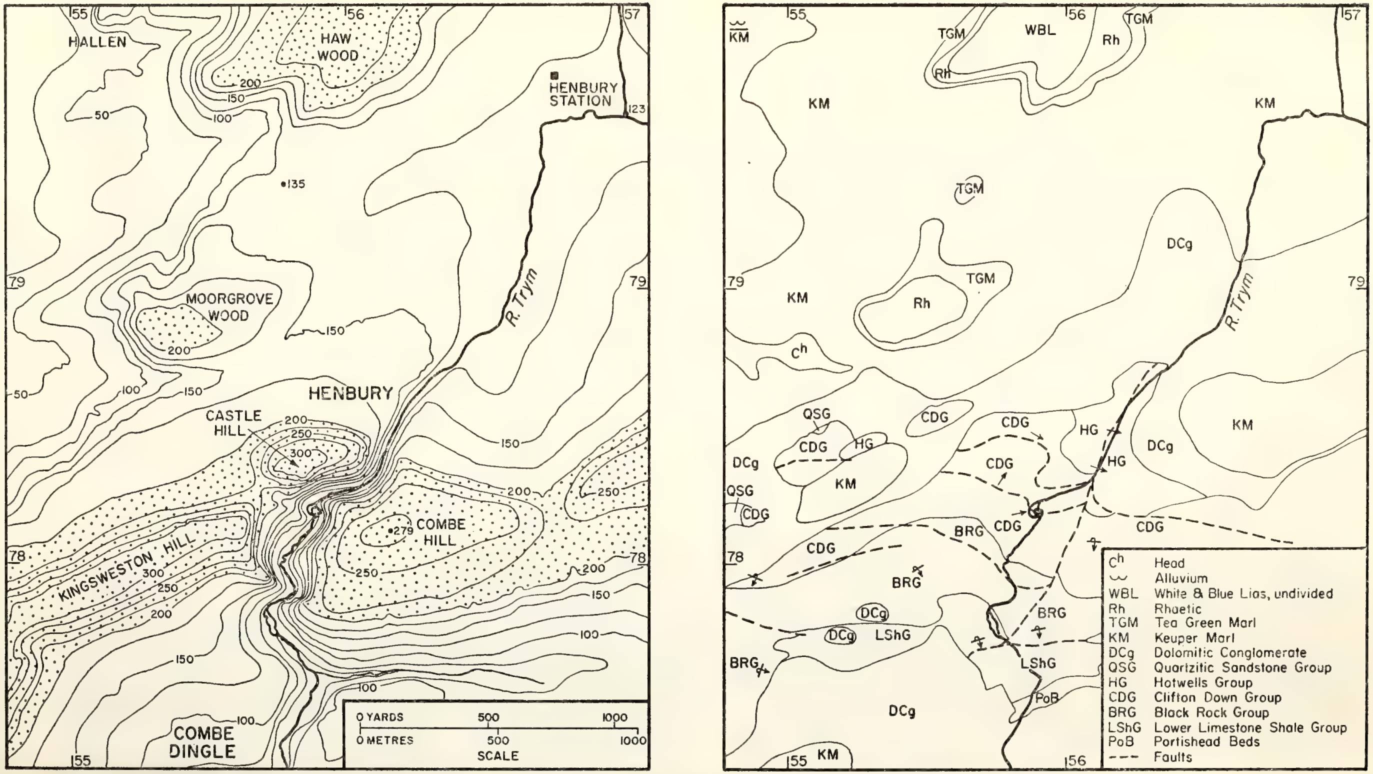
HALLEN
HAW WOOD
HENBURY STATION
MOORGROVE WOOD
R. Trym
HENBURY
CASTLE HILL
COMBE HILL
•279
•135
KINGSWESTON HILL
COMBE DINGLE
55
56
57
78
79
123
50
100
150
200
250
300
0 YARDS 500 1000
0 METRES 500 1000
SCALE
KM
TGM
WBL
Rh
DCg
CDG
HG
QSG
BRG
LShG
PoB
C^h
C^h Head
Alluvium
WBL White & Blue Lias, undivided
Rh Rhaetic
TGM Tea Green Marl
KM Keuper Marl
DCg Dolomitic Conglomerate
QSG Quartzitic Sandstone Group
HG Hotwells Group
CDG Clifton Down Group
BRG Black Rock Group
LShG Lower Limestone Shale Group
PoB Portishead Beds
Faults

Fig. 1. Relief and geology of the Henbury Gorge region; taken from Ordnance Survey and Institute of Geological Sciences 6″ map ST 57 NE.

Bradshaw has summarised the hypotheses on the origin of the gorge. Although Harmer (1907, p. 485) had suggested a glacial diversion, the area was outside the accepted glacial region. Consequently, most recent authors have supported an origin in which an alignment initiated on Mesozoic rock was then superimposed on to the Carboniferous strata.

Henbury Gorge (Fig. 1)

Looking southward from north of Henbury village, the wooded skyline is broken by the deep incision of the Trym gorge (Fig. 4) where the River Trym breaches the Carboniferous ridge. The sinuous nature of the gorge increases its aesthetic appeal, while the river gradient of 50 ft. (15m.) in 1,000 yds. (910m.), 1:60, facilitated the construction of ornamental ponds in the past. The absence of quarrying and highway clearance has left the gorge unscarred. Only occasional near-vertical crags occur, elsewhere scree accumulation provides gentler wooded slopes. The steepest part of the gorge is in the north.

After flowing southwards across the almost flat Triassic plain (Fig. 1), the river south of Henbury locally follows the line of the Henbury Fault and flows through an almost strike valley in the Hotwells Group. Southeast of Castle Hill the river changes direction to W.S.W., through the steepest part of the gorge. A fault, which joins the Henbury Fault from the west, passes through the 60 ft. (18m.) deep col between Castle Hill and Kingsweston Hill. South of this col, the main gorge, though sinuous, follows a general north-south alignment with no apparent geological control. However, in the region south of the hill crest, the overturned disposition of some of the strata and their shattered and sheared nature (Geological Sheet ST 57 NE) implies that some structural feature may have affected the river direction.

The Trym is a small river and upstream of the gorge, the drainage basin is only about 3 square miles in area. It is therefore, "in every sense, a misfit" (Hawkins & Kellaway 1971, p. 269). From the spot height on a bridge over the river (ST 570796), the height of the river plain is about 121 ft. (36·9m.) O.D. South of the old Henbury station, the river takes a southerly course and cuts a 200 ft. (60m.) deep gorge through the ridge of Carboniferous Limestone instead of taking a westerly, more direct and easier route across the less resistant Keuper Marl. The floor of the western col, between Haw Wood and Moorgrove Wood is only 135 ft. (41m.) O.D., being less than 15 ft. (5m.) higher than the river near Henbury Station, just over half a mile away.

There is no direct proof that the Henbury gorge is the result of glacial diversion, as Harmer (1907) suggested. Smith (1963) discarded the idea but it was resurrected by Hawkins & Kellaway (1971).

Hanham Gorge (Fig. 2)

Upstream from Bristol, the River Avon between Netham and Hanham Mills is entrenched in the Pennant Series. Much of the downstream part of the gorge between Netham and Conham, is heavily industrialised. In this region, the 75 – 150 ft. (23 – 46m.) deep valley is alternately steep and gentler-sided, depending on whether it is an undercut or slip-off meander slope. South of Eastwood Farm, the valley becomes narrower, steeper and more gorgelike. Here, through East Wood, the western slope is steep and vertical in places where the generally wooded natural slope has been disturbed by quarrying or railway excavation. The eastern slope varies, depending on the position of the river channel, being steepest in the northern part of Hencliff Wood. The alluvial floor of the gorge is up to 100 yds. (90m.) wide and infills a buried rock valley 40 – 50 ft. (12 – 15m.) deep.

The correlation between the gorge and the geology is seen in Fig. 2. South of Conham, the Pennant Series has a N.N.W. strike similar to the general alignment of the gorge. The variation of direction in the Conham area was probably structurally controlled and accentuated by the inflow discharge of the Conham Brook, slowly diverting the river. In the Crew's Hole area, the river again approximately follows the strike. Thus, whilst not in exact concordance with the geology, it has obviously been important in influencing the alignment of the river.

Frenchay Gorge (Fig. 6)

Although only 75 – 100 ft. (23 – 30m.) deep, the sinuous course of this wooded glen between Frenchay and Broom Hill is one of the most pleasant walks in Bristol. The steep slope changes sides with the swing of the meander. The eastern down-dip side is generally steeper and less frequently interrupted by old quarries than the western side. The gorge alignment is generally similar to that of the strike. Thus, whilst the River Frome was superimposed from the overlying Mesozoic rocks, its present course is probably influenced more by the strike than by anything else.

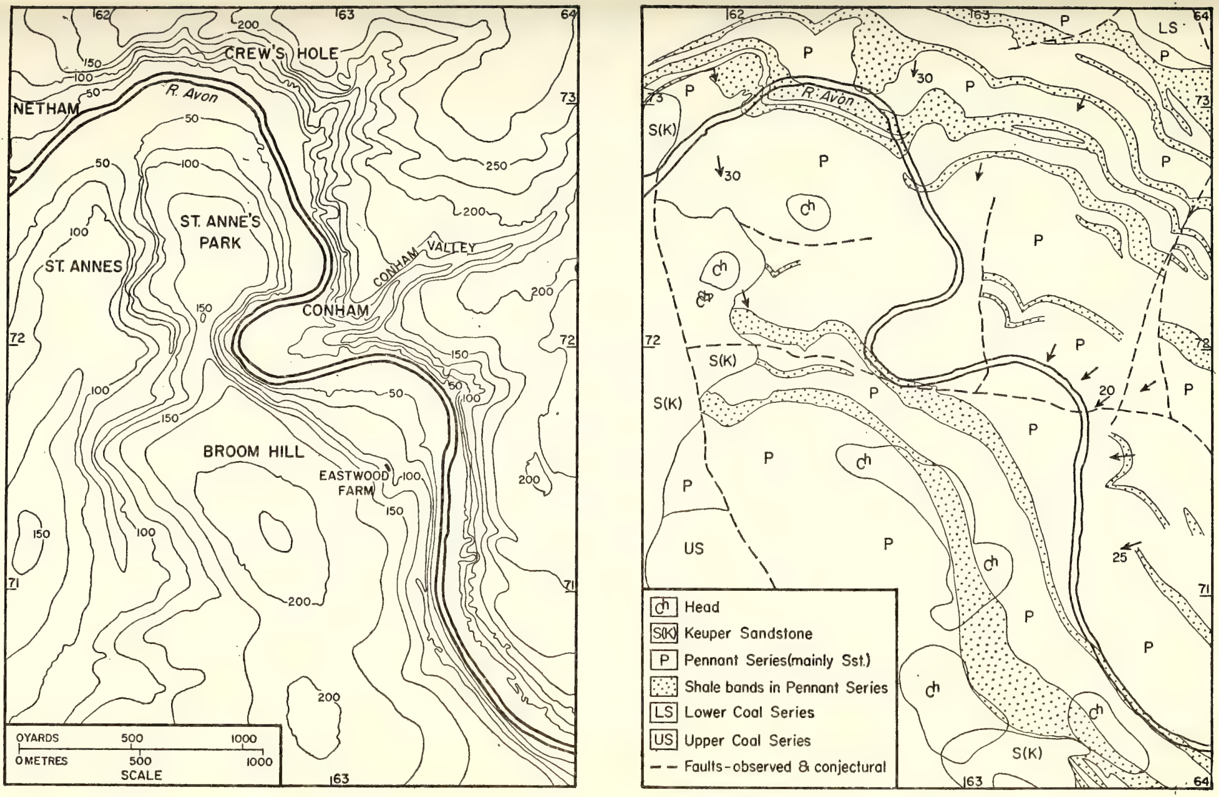
162
163
64
73
72
71
CREW'S HOLE
NETHAM
R. Avon
ST. ANNE'S PARK
ST. ANNES
CONHAM
CONHAM VALLEY
BROOM HILL
EASTWOOD FARM
50
100
150
200
250
0 YARDS 500 1000
0 METRES 500 1000
SCALE
LS
P
S(K)
US
ch
30
20
25
ch Head
S(K) Keuper Sandstone
P Pennant Series(mainly Sst.)
Shale bands in Pennant Series
LS Lower Coal Series
US Upper Coal Series
Faults-observed & conjectural

Fig. 2. Relief and geology of the Hanham Gorge region; taken from Ordnance Survey and Institute of Geological Sciences 6″ map ST 67 SW.

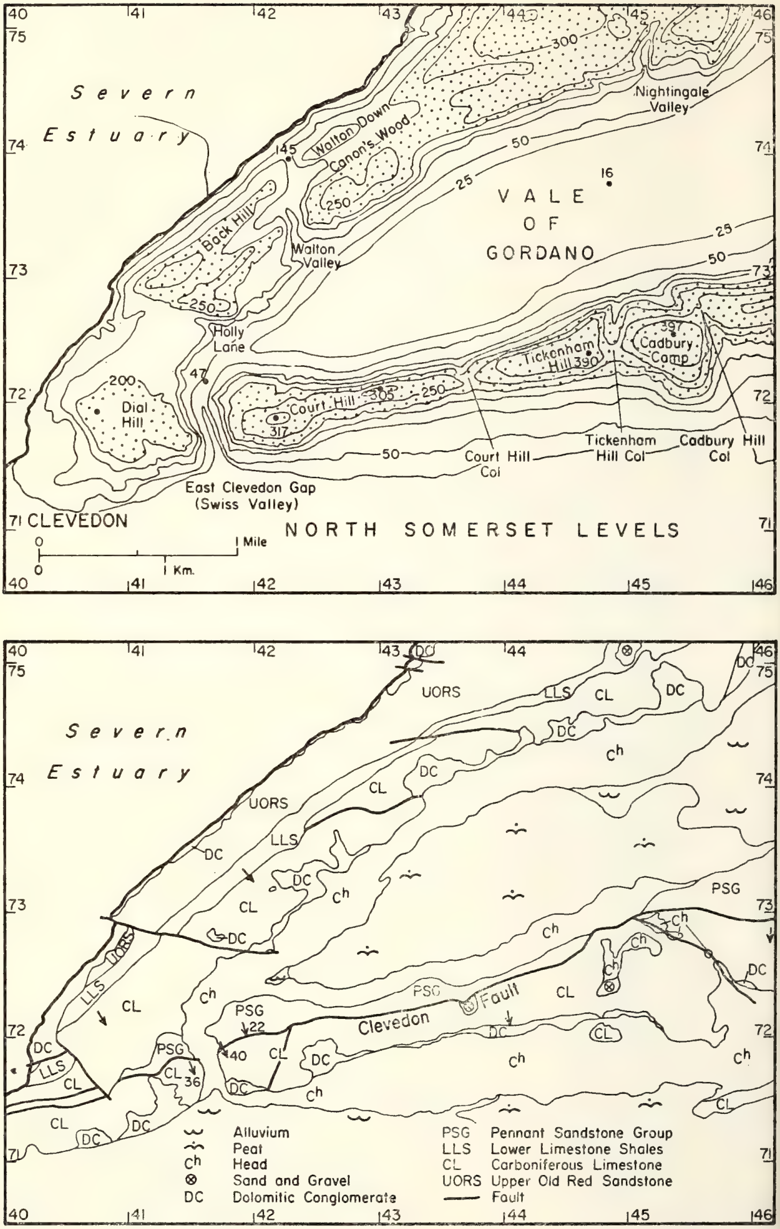
Severn Estuary
Walton Down
Canon's Wood
Back Hill
Walton Valley
Holly Lane
Nightingale Valley
VALE OF GORDANO
Dial Hill
Court Hill
Tickenham Hill 390
Cadbury Camp
397
317
305
145
16
47
200
250
300
50
25
Court Hill Col
Tickenham Hill Col
Cadbury Hill Col
East Clevedon Gap (Swiss Valley)
CLEVEDON
NORTH SOMERSET LEVELS
0
1 Mile
1 Km.
40
41
42
43
44
45
46
71
72
73
74
75
UORS
LLS
CL
DC
PSG
ch
Clevedon Fault
22
40
36
Alluvium
Peat
Head
Sand and Gravel
Dolomitic Conglomerate
PSG Pennant Sandstone Group
LLS Lower Limestone Shales
CL Carboniferous Limestone
UORS Upper Old Red Sandstone
Fault

Fig. 3. Relief and geology of the Clevedon area; taken from Ordnance Survey and Institute of Geological Sciences 2½″ map ST 47.

East Clevedon Gap (Fig. 3)

This wooded gorge, sometimes known as Swiss Valley, is near the junction of the Portishead—Clevedon and Failand Ridges. The head of the gorge opens gradually into the western apex of the Vale of Gordano, in contrast to the abrupt southern opening on to the North Somerset Levels. The floor of this gorge is generally between 20 – 35 ft. (6 – 11m.) O.D., but rises to 47 ft. (14m.) O.D. at the northern end (ST 416721). The sides rise steeply (Fig. 4), with almost vertical crags in places.

The N.N.W. East Clevedon Gap breaches the Carboniferous ridge almost at right angles to the strike. The main Clevedon Fault (thrust) has an orientation almost parallel to the strike and will not have influenced the location of the gorge. With the varying orientation of other faults in the area and the recent location of more in the M5 Motorway excavations, it is possible that the direction of the valley may be fault aligned. The M5 excavations have also revealed a number of strong joints, often with calcite veins, trending in a similar direction to the East Clevedon gorge. Since Sanders' map, the gorge has been shown as floored with Keuper Marl. Greenly (1919, p. 143) states that no exposure could be seen to confirm this, until he located the small Woodside outlier at 130 ft. (40m.) O.D. and a narrow rim of Dolomitic Conglomerate at the back of the cottage gardens in the middle of the gorge. Unfortunately, neither of these exposures can be confirmed. Behind the cottages, calcreted fine gravel has been located and it is possible that it was to this that Greenly referred. While not solving the question as to the possible Triassic origin of the gap, Greenly (1922, p. 373) did draw attention to the vast amount of loamy sand and breccias at eight localities within a mile of the gorge. There is an overall stratification of these deposits but individual beds are unstratified. The deposits are banked up against the rock slopes, up to 180 ft. (55m.) O.D. and have stratification dips of up to about 32°, approximately the angle of repose. Greenly also noted that the breccia is almost exclusively of local rock, but that the heavy minerals of the sandy matrix suggested a foreign source for the finer grade material. To explain this he invoked aeolian transport.

Since 1969, sandy loam and breccia have been examined at many localities to the east of the gorge, especially in the vicinity of the M5 Motorway/B3130 road underpass (ST 426715) where it is known to be 26 ft. (8m.) thick, and to the north in the Parish of Clapton in Gordano. Beneath the topsoil, sections up to 9 ft. (3m.) deep have shown a succession of two sandy breccias separated by a loamy sand between 9 ins. (0·2m.) and 3 ft. 6 ins. (1·1m.) thick. In 1969, sewer trenches in the floor of the East Clevedon Gap did not reach the Keuper Marl, which floors the whole length of the gorge according to geological maps ST 47 (2½ ins. to 1 mile) and Sheet 264 (1 in. to 1 mile). Therefore, Borehole ABH 9 was made just south of the Church (ST 41647166) to determine the depth of superficial deposits and the thickness of the Keuper Marl. The borehole proved 42½ ft. (13m.) of sands and calcreted sandy gravel overlying Carboniferous Limestone. Thus, at this point at least, no Keuper Marl exists in the floor of the valley. Further, from a ground surface of 24·5 ft. (7·5m.) O.D. superficial deposits were proved to at least –18 ft. (–5·5m.) O.D. It is unlikely that this one borehole was in the deepest part of the buried valley and the rock floor may well be –25 ft. (–7·6m.) O.D. or lower; a not dissimilar depth to the Clifton Gorge at –39·3 ft. (–12m.) O.D.

Tickenham Hill Valley (Figs. 3, 4 & 5)

The long, straight Tickenham ridge is notched by a series of cols and valleys along its length. To the east of Swiss Valley is first the gentle Court Hill col, followed by the more gorge-like Tickenham Hill Valley, Figs. 3 and 4. The Tickenham Hill Valley is shown in more detail in Fig. 5. The southern end of this valley is blocked by a barrier of calcreted gravel rising to 290 ft. (88m.) O.D., from which slopes descend steeply to approximately 240 ft. (73m.) O.D. to the south, and 260 ft. (79m.) O.D. to the north. The northern part of the valley is over 100 ft. (30m.) deep and typically U-shaped, until it is incised below 230 ft. (70m.) by a smaller valley.

Reynolds (1916), showed post-Carboniferous rocks forming the valley barrier, while the geological maps indicate Dolomitic Conglomerate here and Keuper Marl in the valley floor. The calcreted sandy gravels have been examined and found to contain Greensand chert, which is also present in the sands mapped as Keuper Marl. In 1970, Borehole ABH 8 at ST 44857242 proved 45 ft. (13·7m.) of gravel and sand, the core indicating that the deposit was more sandy than the gravels at Court Hill. From the sands, Dr. J. W. Murray has identified six species of Jurassic and Cretaceous foraminiferids. At the northern end of the valley, excavations for the M5 Motorway Wynhol Viaduct have proved large quantities of sand in fissures and open joints (probably solution caverns) in the Carboniferous Limestone, while at Wynhol Bungalow (ST447726), on the S.W. side, sands have been seen to exceed 5 ft. (1·5m.) in depth. An old pit on the northern side of the valley barrier shows angular fragments unlike anything seen in the gravels. These fragments resemble the breccias in the Clevedon area and like them, are probably later in age; resulting from frost shattering of the gravels and rock mass.

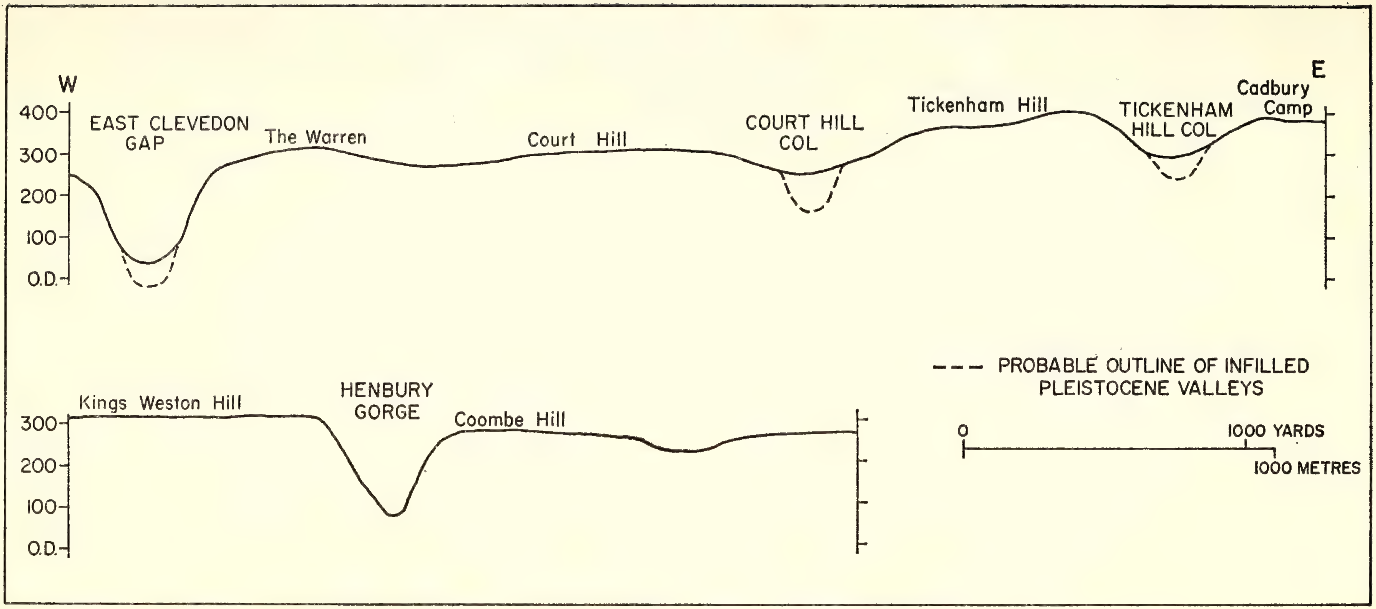

Fig. 4. Sections illustrating the relief along the ridge crest in the Clevedon and Henbury regions, note Figures 1 and 3.

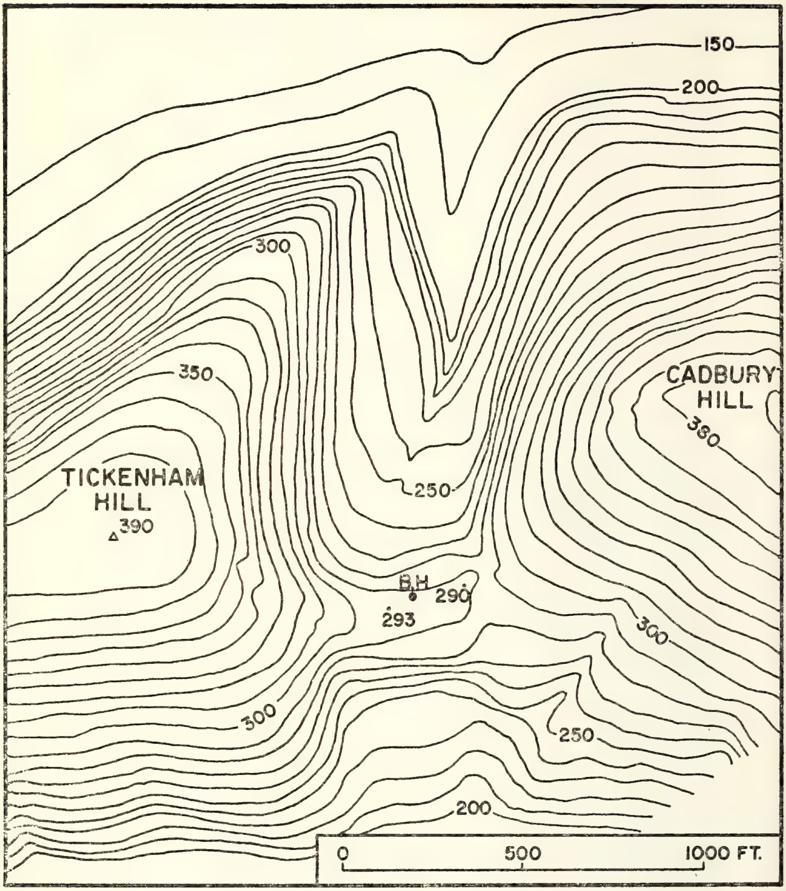
150
200
300
350
TICKENHAM HILL
390
CADBURY HILL
380
250
B.H
290
293
300
300
250
200
0
500
1000 FT.

Fig. 5. Relief of the Tickenham Hill col. Taken from Freeman Fox Drawing 530/P1/2.44.

Till has not been seen in this valley, otherwise the deposit resembles that at Court Hill where till has been examined.

Keynsham Gorge (Fig. 6)

For more than six miles upstream from Chewton Place (ST 656669) the River Chew meanders freely across a flood plain, in places 300 yds. (270m.) wide. Downstream between the confluence with a western tributary and the weir, the flood plain suddenly narrows and the steep sides give a gorge-like impression. There is no apparent geological reason why the easterly flowing River Chew should turn abruptly to the north at Compton Dando. No fault has been proved in the Chew gorge, despite examination during the building of the Keynsham Bypass (Hawkins, 1966). The shape of the gorge is obviously strongly influenced by the resistant Blue Lias limestones, but these also continue to occur as a "roof rock" south of Chewton Place and hence cannot explain the abrupt change of morphology seen in that locality.

Rickford Gorge (Fig. 6)

The 200 ft. (60m.) deep, dry, meandering Rickford Gorge is very attractive. The southern side of the gorge continues the general Mendip line (Hawkins & Kellaway 1971), while to the north, Combe Lodge Hill protrudes as a spur. The gorge, incised through the Dolomitic Conglomerate spur, has no catchment and is left abandoned, 150 ft. (46m.) above the Yeo Valley which is less than a mile away.

Whatley Gorge (Fig. 6)

This name has been given to the 100 ft. (30m.) deep gorge on Fordbury Water, between Cranmore and Whatley. A large actively worked quarry is situated at the abrupt upstream end of the gorge where it breaches the Carboniferous Limestone through Asham Wood. Downstream, the valley opens as it crosses the Lower Limestone Shales before steepening again as it passes from the Old Red Sandstone back into the Black Rock Group in the vicinity of Whatley quarry. The catchment area of the river is less than 5 square miles, and even if supplemented by spring water, it is unlikely that it would have been sufficient to erode the gorge.

ORIGINS OF THE GORGES

From the above discussions, there are two types of gorge in the Bristol district; those such as Hanham and Frenchay, roughly parallel to the strike, while the others breach hill ridges almost at right angles to the strike. The Hanham and Frenchay gorges also differ from the others (except the Keynsham) in being lower, eroded into the Pennant Series and having valley floors not far beneath the basal Trias unconformity.

During the last three years, evidence has been found to suggest that much of North Somerset has been glaciated (Hawkins & Kellaway 1971). The first evidence was from trenches in the Kenn area where till-like deposits and a sand containing some cool water foraminiferids were found in August 1969. As a result of a careful study of the sewer trenches through the "Burtle Beds" at Kenn, glacially striated Carboniferous Limestone boulders, weighing up to 12 cwts. (600 kilograms) were located. The first large till mass was found by D. D. Gilbertson in April 1970 during the widening of the New Cut. The same month, G. A. Kellaway and the author, examining the M5 Motorway excavations on Court Hill, found glacial deposits in the col. Thus, during early 1970, two advances were made: the realisation, first, that the Kenn deposits were really a glacial sequence of till and outwash gravel, marginally overlain in parts by a marine sand and secondly that channels, now infilled with sand and gravel, breached the Tickenham Ridge.

The 60 ft. (18m.) deep excavation at Court Hill was mainly through gravels composed of rounded to sub-rounded Carboniferous Limestone, Triassic sandstone, sub-angular Cretaceous chert and occasional Pennant sandstone. The gravels vary in size from coarse sand to cobbles 2 ft. (0·6m.) across; the variation often giving a stratification which is seen to dip northwards at 37°. Trimmer (1853, p. 284) referred to calcreted glacial gravels on Court Hill and, although this has been almost forgotten or discounted in the intervening years, he has been proved correct. Reddish till has been seen on the eastern side of the cut within the gravels, about 15 ft. (4·6m.) from the surface and also up to 1 ft. 6 ins. (0·5m.) thick in some places beneath the gravels, overlying a medium grade cross-bedded sand. The sand has yielded nine species of Jurassic and Cretaceous foraminiferids, identified by Dr. J. W. Murray. On the western side, rounded coarse gravels and cobbles with a high percentage of Greensand chert were seen to interfinger with the sands in a 14 ft. (4·3m.) deep trench. These lower sands have been proved to be at least 25 ft. (8m.) thick. From many boreholes it is known that the deepest part of the rock valley is at about 163 ft. (49·7m.) O.D. The discovery of the Court Hill Channel was of major importance and, as a result, a study was made of the Tickenham Ridge to locate similar features. It was soon found that the "Triassic" deposits mapped by the Institute of Geological Sciences in the Tickenham Hill Valley were really post-Cretaceous at the

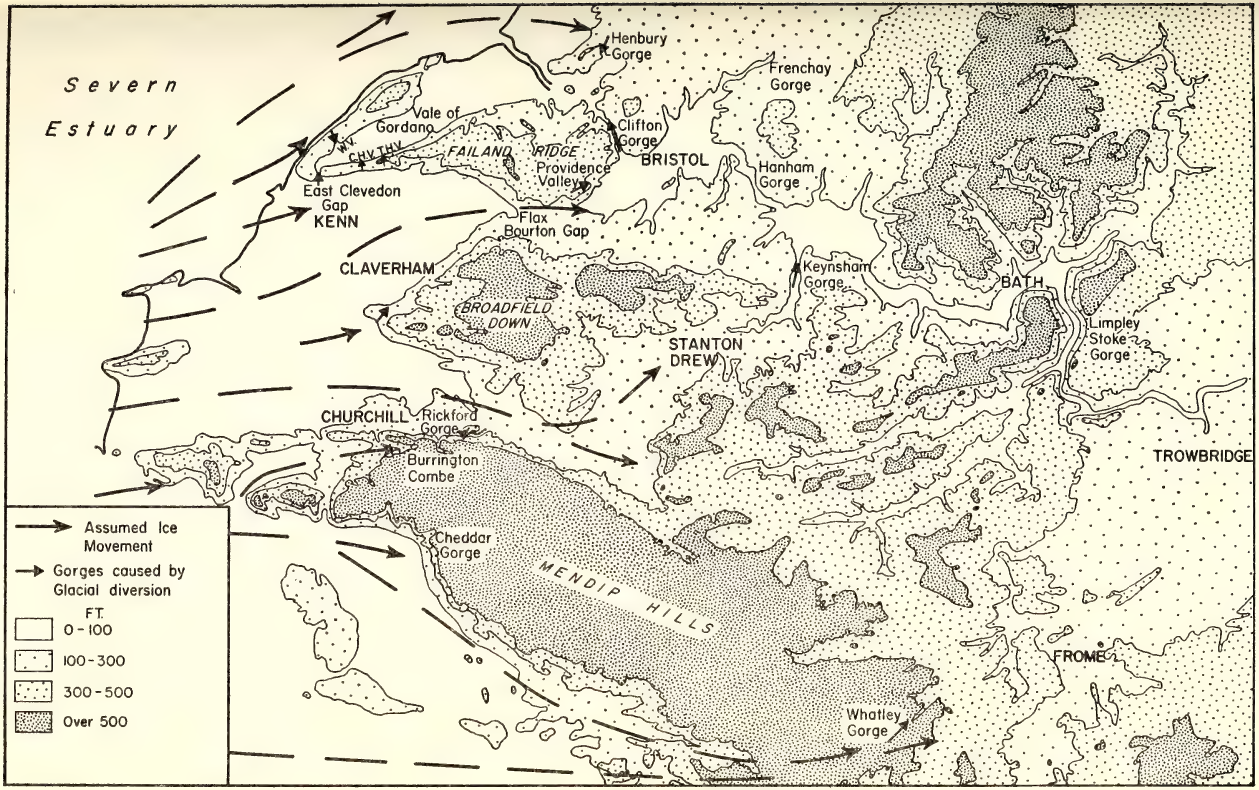
Severn
Estuary
Henbury Gorge
Frenchay Gorge
Vale of Gordano
Clifton Gorge
WV.
CHV THV
FAILAND RIDGE
Providence Valley
BRISTOL
Hanham Gorge
East Clevedon Gap
KENN
Flax Bourton Gap
CLAVERHAM
Keynsham Gorge
BATH
BROADFIELD DOWN
STANTON DREW
Limpley Stoke Gorge
CHURCHILL
Rickford Gorge
Burrington Combe
TROWBRIDGE
Cheddar Gorge
MENDIP HILLS
FROME
Whatley Gorge
Assumed Ice Movement
Gorges caused by Glacial diversion
FT.
0-100
100-300
300-500
Over 500

Fig. 6. Relief map showing features referred to in the text. WV = Walton Valley. CHV = Court Hill Valley. THV = Tickenham Hill Valley.

oldest, because they contained Greensand chert and Jurassic and Cretaceous foraminiferids. The presence of till in the Court Hill Channel confirmed their Pleistocene age.

The Clevedon Area. In this area there are two gorges, the East Clevedon Gap and the Tickenham Valley, an infilled gorge (the Court Hill Valley) and a valley with no catchment area (the Walton Valley). The rock floor of the Court Hill Valley has been proved to be not higher than 163ft. (49·7m.) O.D. and therefore, the deepest part probably descends to about 160 ft. (49m.) O.D. The depth of the Tickenham Hill Valley is not known but proved by a borehole to be lower than 245 ft. (75m.) O.D. The sudden break of slope on the south side, between 230 ft. (70m.) and 240 ft. (73m.) probably indicates a change in geology. A rock floor at this height would be in accordance with the topography in the northern part and until further evidence is available, a height of 240 ft. (73m.) O.D. for the southern end of the valley is suggested. In the Walton Valley (Fig. 3), the western end is at 145 ft. (44m.) O.D. within 270 yds (247m.) of the present coast. Therefore, in each case, the valley head at 145 ft. (44m.), 160 ft. (49m.) and 240 ft. (73m.) has no catchment and it is consequently very difficult to explain them without involving glaciation.

The presence of till in the only excavated valley confirms this and, for the author, ends the speculation about the possible glaciation of this part of Somerset. Following this, although no positive evidence is available, it is now possible to suggest a glacial origin for the East Clevedon Gap. This gorge, however, is different from the others in having a rock floor to at least –18 ft. (–5·5m.) O.D.; comparable in maximum depth to the Clifton Gorge (–39·3 ft. (–12m.) O.D.), but with no surface stream in contrast to the big tidal river of the Clifton Gorge. Considering the small size of the Vale of Gordano, the rock floor at its seaward end is both deeper, –44 ft. (–13.4m) O.D. (Hawkins 1968, p. 423) and wider than would be anticipated. However, if vast quantities of glacial meltwater from ice impinging on the ridges escaped through here, these dimensions are more understandable. The thick sand described by Jefferies, Willis & Yemm (1968) in the Vale of Gordano is therefore probably a glacial outwash deposit and not an estuarine sand. This explanation would also account for the sparsity of any foraminiferids and the absence of Recent species.

The Henbury Gorge. As described earlier, the River Trym, instead of taking a direct route across the Triassic rocks via Hallen to the Severn, turns south near the old Henbury Station and breaches the Carboniferous Limestone ridge. With the glacial evidence in the Severn Beach area and the finding of till veneering the Trias beneath the alluvium in the Shirehampton area (Hawkins, m.s.) there is little doubt that in the past, ice would have penetrated at least to the steep hillslopes along the east of the Severn alluvium. Thus, any westerly flowing stream would have been at least temporarily diverted. It is not yet possible to explain the col occupied by Henbury Road.

The Clifton Gorge. The evidence at Kenn and the valleys with no catchment in the Clevedon area indicate that glaciers came this far into Somerset. Trimmer (1853, p. 284) mentions the deposit at Yatton while Greenly (1919, p. 145) compares the vast spreads of superficial material (indicated as Head on I.G.S. Geological Sheet 264) in the Claverham and Yatton areas to till. Referring to the deposits east of Yatton Station and in the Little River at North End, he states (p. 147), "In fact, the formation recalls the true boulder-clays, but the extreme rarity of striated stones, the feebleness of the striations, and the almost total absence of erratics, forbid us to regard it as such". The present exposures reveal sub-rounded to rounded gravel with some cobbles, mainly of Carboniferous Limestone, but with subsidiary Carboniferous chert, sandstone, White Lias, quartz, Cretaceous flint and chert in a silty sand matrix. The base of the deposit is highly irregular, while the gravels have frost wedges and are cryoturbated. One gravel mass, about 15 ins. (0·4m.) in diameter is seen, in the river bank, to be surrounded by what appears to be weathered green Keuper Marl. The presence of the included gravels, however, suggests that this may be another till deposit; similar to that at the New Blind Yeo Drain at Manmoor Lane and Kingston Seymour Bridge where what appeared to be Keuper Marl was found to contain modern marine shells, and Liassic limestones and Greensand chert respectively. Unfortunately, deposits, marked as Head on the I.G.S. geological maps, in the Flax Bourton region have not been exposed recently. However, Kellaway (1967) records Greensand chert at Ashton Park in what "had previously been thought to be undisturbed Keuper Marl". These deposits will be recorded in more detail in the future. With this support it is reasonable to argue that past ice would have blocked the area between the Tickenham Ridge and Broadfield Down. Hawkins & Kellaway (1971) suggest that the Providence Valley (Fig. 6), another valley with no catchment, indicates that the ice reached at least to Long Ashton, hence blocking the Flax Bourton Gap, diverting the River Avon to the lowest alternative outlet and so creating the Clifton Gorge.

Rickford, Burrington and Keynsham Gorges. Recent examination of some temporary exposures of the Head deposits in the Churchill area has led to a re-interpretation of their origin. Near the new Churchill Comprehensive School (ST 436600) up to 3 ft. (0·9m.) of sub-rounded to rounded gravel and cobbles, mainly of sandstone but also containing Carboniferous Limestone, quartz and some Greensand chert can be seen in a highly weathered, iron and manganese stained, silty sand. However, within 10 yds. the deposit changes and consists mainly of sand. The variability and nature of the deposits both here and at the other temporary exposures in the area which are marked as Head on the I.G.S. geological map (Sheet 280) closely resemble till. It is therefore suggested that at least some of the deposits marked as Head are till; it is impossible to say more, until further exposures allow more of the deposits to be examined.

Hawkins & Kellaway (1971, p. 289) have suggested that the Rickford Valley has a glacial origin, the most plausible hypothesis to explain this valley with no catchment. Accepting this, and that the Bleadon deposits are fluvio-glacial (Findlay, Hawkins & Lloyd 1972), it is possible also that the river which eroded Burrington Combe was blocked from taking its natural westerly outlet to Dolebury owing to the presence of ice in the Winscombe Vale, hence diverting the river and eroding the present gorge.

It is envisaged that before this early ice diversion the headwater of the Chew/Yeo rivers would have been the westerly valley which enters the present Chew system at Chewton Place, Keynsham; the river Chew then flowing westwards. The blocking of the Yeo/Chew valley, however, caused an overflow channel to form in the Keynsham area. With the change in direction, following the ice recession, the region around Bickfield Farm between Blagdon and Chew Reservoirs, became the new watershed separating the two rivers/catchments.

The giant stones of Stanton Drew, some of which are 27 tons (27 tonnes) in weight, may indicate the approximate limit of an ice advance up this valley. The large rocks, examined by G. A. Kellaway and the author, consist of silicified Dolomitic Conglomerate (from Broadfield Down), Old Red Sandstone, Dundry Freestone and sarsen. If the megalith builders brought these stones from their source regions, then why did they fetch stones only from the west and not include any Triassic Sandstone or Pennant Sandstone which outcrop closer to the east (Kellaway 1971, p. 34)? It is believed that the stones were glacially deposited within this region in a moraine, before being collected and used to build the monument. Hautville's Quoit remains apart from the other stones today.

Grinsell (1969) notes that it is in line with The Cove and the Great Circle and that it has been reduced in size for road mending, while the second stone has been totally removed. It may have been placed there for some reason not yet clear to the archaeologist; it may have been dropped "in transit" or alternatively, it may never have been moved from its morainic position.

The Whatley Gorge. Evidence for glaciation south of the Mendips comes from Brent Knoll (Kellaway 1971, p. 30) and Bleadon Hill (Findlay, Hawkins & Lloyd 1972, in press). Kellaway also reported chalk, flint, chert, sandstone and Carboniferous Limestone and Jurassic Limestone pebbles in a sandy clay matrix at Holwell, within half a mile of the Whatley Gorge and suggested it was a relic till. Similar pebbles, apart from the chalk, occur in the soil removed before quarrying at Whatley, while the 1:10,560 I.G.S. geological sheets refer to "much chert" near Whatley Bridge and "sands and gravels of unknown age" on Fuller's Earth Rock in the Great Elm area. This, plus the "Brown, grey and green silt with brash of spicular chert nodules possibly of Upper Greensand origin" from such areas as East End, Stoke St. Michael (6″ I.G.S. geological sheet ST 64 NE) and the big well-rounded boulders of sandstone and occasional limestone weighing up to about 8 cwts. (400 kg.) which are overlying Black Rock Limestone, seen in the valley at Combe Farm (ST 733462, 6″ I.G.S. geological sheet ST 74NW) support the theory that the area has been glaciated. It is suggested, therefore, that the Whatley Gorge was not entirely cut by the Fordbury Water, but was accentuated by meltwater discharge from ice in this region.

The Limpley Stoke Gorge is less satisfactorily explained. It is probable that the early headwater of the River Avon occupied the Box Valley prior to the cutting of the gorge (Hawkins & Kellaway 1971, p. 278). Recently, the deposits on Bathampton Down and Kingsdown, which are either side of the gorge, have been examined in temporary exposures and interpreted as of glacial origin. This suggests that an early ice advance reached this area. However, if the gorge is to be accounted for by glacial diversion, then it is necessary to stipulate the blocking of many other (at present lower) outlets such as the Vale of White Horse c. 290 ft. (88m.) O.D., Bruton Gap at *c.* 370 ft. (110m.) O.D. and the Vale of Pewsey at *c.* 380 ft. (115m.) O.D.

AGE OF THE GORGES

It is difficult to date the age of the diversions described above. The only two pieces of evidence are, firstly, that in the Kenn area the glacial deposits are partially overlain by marine sand, hence they are probably pre-Ipswichian and, secondly, that in the case of the Flax Bourton Gap the lowest point is at about 155 ft. (47m.) O.D. Hence, if we accept the normal sea level chronology, the diversion must have been in the Middle Pleistocene.

The following names are given to the periods in the Middle and Upper Quaternary, partly after West (1968, p. 230):—

QUATERNARY	Holocene		Flandrian
	Pleistocene	Upper	Weichselian, Devensian, Wurm, Last Glaciation
			Ipswichian, Eemian, Last Interglacial
			Wolstonian, Gipping, Saale, Riss
		Middle	Hoxnian, Great Interglacial
			Lowestoftian, Elster, Mindel
			Cromerian
			Beestonian
			Pastonian

At present there are no known Weichselian deposits east of the Severn Estuary, although they do occur in the Newport—Cardiff area (Bowen 1970, p. 198). Despite much speculation, the heights of the interglacial sea levels are not known. However, it is generally agreed that the Ipswichian level was not above 50 ft. (15m.) O.D. and the Hoxnian not above 80 ft. (24m.) O.D. It is almost impossible even to speculate on the height before the Lowestoftian Glaciation. This means, however, that the Avon flowed westward through the Flax Bourton Gap at some time in the Middle Pleistocene. The Lowestoftian is the earliest known glaciation in Britain and therefore, until further evidence is available, it is better to consider that it was this glaciation which blocked the Flax Bourton Gap and was indirectly responsible for cutting the many gorges. The later Wolstonian Glaciation reached into the lowlands of Somerset, but probably did not extend as far as the glacial limits shown in Fig. 6. The lowland glacial deposits of the Kenn area, however, are probably Wolstonian in age.

ACKNOWLEDGEMENTS

The author is grateful for financial support received from the Natural Environment Research Council (N.E.R.C.) and thanks Miss S. L. Pritchard and D. D. Gilbertson; G. A. Kellaway of I.G.S.; and M. G. Lewis and C. S. Morgan of Freeman Fox and Partners, who gave time for many helpful discussions. Mrs. Gregory is thanked for drawing the diagrams and J. W. Murray for identifying the foraminiferids.

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1972

PROCEEDINGS

OF THE

Bristol Naturalists' Society

EDITED BY J. W. COWIE
ASSISTED BY A COMMITTEE

BRISTOL NATURALISTS' SOCIETY

"Rerum cognoscere causas"—Virgil

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REPORT OF COUNCIL, 1972

THE membership now stands at 807 including 78 juniors. There are 12 affiliated Societies. The Annual General Meeting elected Mrs. A. J. Hollowell as President and the other Officers and Members of Council. The Annual Dinner was held in March in the Senior Common Room of the University after which our guest speaker, Dr. D. A. Bassett, gave a talk on "The Characteristics of Geologists". In December the Society held a Wine and Cheese Party in the Red Lodge, this was a well attended and successful event.

The Society has reprinted an article from our *Proceedings* on the Cheddar Gorge Survey. This is now available for sale in pamphlet form at the Bristol Museum and elsewhere.

A course of eight meetings on "Some principles of local ecology" was arranged by the Department of Extra-Mural Studies, University of Bristol, in conjunction with the Society. The W.E.A. arranged a series of eight lectures given by a panel of speakers provided by our Society on "Topics in Ornithology".

A decision was made to rejoin the South West Naturalists' Union after an interval of several years. Talks continue with local Natural History Trusts concerning possible implications of local government boundary changes. We regret we have to report the deaths of Dr. A. M. G. Campbell and Mrs. V. Dennison.

AUDREY HECKELS, *Hon. Secretary.*

LIBRARIAN'S REPORT, 1972

DURING 1972, the Society's library was visited on 90 occasions, 50 more than the previous year; and 407 books and journal volumes were borrowed by 62 different people. We hope this encouraging increase in the use of the library will continue, as more and more members realise its value.

In order to provide much-needed space, the society's collection of little-used foreign journals is being checked with a view to their possible sale. The *Bulletin of the American Museum of Natural History* was sold to the University of Bristol in the summer. The proceeds of this sale are to be used to build up the bookstock of the library, with emphasis on general natural history, including ecology and conservation. Several new books have therefore been ordered for the library this year. The Society is also very grateful for gifts of books from Mr. Batty and Mr. Taylor, and particularly so to Miss Brannon, who donated over forty books, mainly on botanical subjects.

We are, as always, indebted to the Director of the City Museum, Bristol, and to the Librarian-in-charge of the Queen's Building Library, University of Bristol, for their assistance, and for providing the library with accommodation.

ACCESSIONS TO THE LIBRARY, 1972

Edlin	Collin's Guide to Tree Planting
Lousley	Flora of the Isles of Scilly
Perkins	Geology Explained in South and East Devon
Tubbs	The New Forest: an Ecological History
Van Den Brink	Field-guide to the Mammals of Europe

J. M. SCHERR, *Hon. Librarian.*

ACCOUNTS FOR THE YEAR ENDED 31 DECEMBER 1972

1971 £		£ p	£ p
	Members' Subscriptions:		
804	Full Members	1,065·65	
77	Full Members of the same household	91·87	
22	Corresponding Members	27·25	
12	Associates	9·00	
33	Juniors	35·00	
25	Affiliated Societies	27·25	
973			1,256·02
4	Donations		4·50
138	*Proceedings*		
	Grants	45·00	
	Offprints	22·50	
	Sales	80·65	
	Advertisements	4·50	
1,115			152·65
5	Field Committee: profit		—
3	Sale of badges		—
3	Profit on dinner and cheese & wine party		12·44
1	Interest from National Savings Bank		1·26
25	Interest on Bonds and premiums thereon		29·90
	Sale of Bulletin of American Museum of Natural History		575·00
5	Members' contributions to the Harry Savory Illustrations Fund		4·50
574	Balance from last account		586·37
£1,731			£2,622·64

1971 £		£ p	£ p
195	General Printing and Stationery	254·90	
177	Postages and telephone	220·11	
12	Clerical assistance	—	
384			475·01
608	*Proceedings* (1971, including offprints and Cheddar Gorge Survey)		736·50
6	Books	9·25	
46	Subscriptions for journals etc.	49·48	
	Rent (of library room)	0·05	
8	Fire insurance (library)	3·95	
			62·73
6	Contributions to Council for Nature etc.		6·25
6	Fares and expenses of general meetings		—
	Field Committee: loss		3·03
80	Grants to Sections:		
	Botanical	10·00	
	Entomological	10·00	
	Geological	10·00	
	Mammal	20·00	
	Ornithological	40·00	
	Junior	10·00	
1,144			100·00
	Balances to next account		
70	Cash in Bank	731·39	
	Less unpresented cheques	7·20	
		724·19	
37	Deposit in National Savings Bank	37·84	
400	*£400 7% British Savings Bonds	400·00	
80	In hands of Field Committee	77·09	
			1,239·12
£1,731			£2,622·64

*Including the Harry Savory Illustrations Fund £63·48

Note: These accounts do not record balances held by sectional treasurers and the Ornithological Section Special Fund of £78·82.

P. J. M. NETHERCOTT, *Hon. Treasurer*,
12 January 1973

Audited and found correct, A. E. BILLETT, *Hon. Auditor*
17 January 1973

REPORT OF THE ENTOMOLOGICAL SECTION, 1972

AT the Annual General Meeting on 4 January the following were elected: President, T. B. Silcocks; Secretary, G. R. Best; Committee: Mrs. R. E. Knight, P. F. Bird, J. F. Burton, A. N. Grose.

The following meetings were held:—

February 8: Butterflies of Malaysia by Flt. Lt. Fullock.
March 7: Biological Pest Control by Mr. Solomons.
April 23: Dymock Wood, Newent (Mr. and Mrs. Knight).
May 13: Haresfield Beacon (G. Best).
June 3: Sandford Hill (Joint with Botanical Section).
July 1: Mendip Light Trapping (with Juniors).
September 30: Amateur Entomologists Exhibition. London.
November 7: Annual Exhibition. City Museum.

G. R. BEST, *Hon. Secretary.*

REPORT OF BOTANICAL SECTION, 1972

AT the Annual General Meeting in the Botany Department Herbarium on 24 January, 1972, the following were elcted: President: Dr. A. F. Devonshire; Secretary and Treasurer: Miss I. F. Gravestock; Committee: Dr. T. E. T. Bond, Dr. D. H. Brown, Mrs. C. H. Cummins, Mrs. N. Vaughan Davies, Mr. C. H. Hurfurt, Mr. P. J. M. Nethercott, Dr. D. H. Peregrine and Dr. C. E. D. Smith.

Following discussions with Museum staff, it was agreed that in future the Wild Flower Table should be the sole responsibility of the Museum, the Botanical Section of the Society no longer being officially associated with it as hitherto. Voluntary assistance from members was, however, welcomed by the Museum, and thanks are due to Mr. E. S. Smith, Mr. and Mrs. Cummins and Mrs. T. B. Silcocks, who assisted the Museum staff during the year.

The following winter meetings were held:—

Jan. 24: Annual General Meeting and a Summary of Findings on the Somerset Flora by Capt. R. G. B. Roe: also Members' Evening.
Feb. 28: Forestry and Wild Life, by Mr. Malcolm Scott.
Mar. 20: Plants of the Devonian Age from Greenland, by Dr. K. C. Allen. Joint meeting with Geological Section.
Oct. 2: Mushrooms and Toadstools, by Dr. C. E. D. Smith.
Nov. 27: Members' Evening, with transparencies.

The following field excursions took place, under the leadership of those shown:—

Mar. 18: Westonbirt Arboretum. Mr. P. J. M. Nethercott.
April 29: Avon Gorge. Mr. P. J. M. Nethercott.
May 20: Killerton Gardens, Devon. Dr. T. E. T. Bond.
May 24: Royal Fort Gardens. Dr. A. F. Devonshire.
June 3: Sandford Hill. Mrs. T. B. Silcocks and Miss I. F. Gravestock.
The hill still supports a rich flora despite quarrying, but the major part of the area is doomed under the permission already granted.
June 20: Rodway Hill. Dr. A. F. Devonshire.
July 15: Bristol Forest, Paradise Bottom. Mr. Malcolm Scott and Mr. C. H. Cummins.
July 29: Biddle Combe Nature Trail and Knapp Hill, Wells. Miss I. F. Gravestock.
Aug. 12: Berkeley to Oldbury-on-Severn. Mr. P. J. M. Nethercott.
An interesting area for coastal and mudbank flora.
Aug. 19: Grandam Rocks, Wick. Mr. C. H. Hurfurt.
Oct. 14: Fungus Foray, Goblin Combe. Dr. C. E. D. Smith.
Despite the dry weather, reasonable numbers of larger fungi were found, including Birds-Nest Fungus (*Cyathus Striatus*), *Mycena pura*, Blewits (*Tricholoma nudum*), *Stropharia aeruginosa* and a number of *Clitocybe* spp.

I. F. GRAVESTOCK, *Hon. Secretary.*

REPORT OF GEOLOGICAL SECTION, 1972

THE Annual Business Meeting of the Section was held on 13 January, 1972, in the Geology Lecture Theatre of the University. The following were elected: President, Mr. A. E. Frey; Vice-President, Mr. D. Hamilton; Hon. Secretary, Dr. A. B. Hawkins; Hon. Field Secretary, Mr. D. Hamilton; Committee: Professor D. L. Dineley, Student President of the University Geological Society (both *ex-officio*), Miss Garland, Mrs. Hamilton, Mr. Harrison, Mr. Hollingsworth and Mr. Leese.

The programme included:

February 17: Film Evening: films entitled "Volcanoes" and "Shoreline Processes".
March 20: Plants of Devonian Age from Greenland, Dr. K. C. Allen. Joint meeting with Botanical Section.
October 26: Glaciation of the Severn Estuary Region, Dr. A. B. Hawkins.
November 23: Geological Successions in the Inferior Oolite of the Cotswolds. Professor D. V. Ager.

The following field meetings took place:—

May 27: Old Charfield Brick Pits. Leader: Dr. M. L. K. Curtis.
June 18: Forest of Dean. Leader: Mr. R. Bradshaw.
July 16: The Wren's Nest, Dudley. Leader: Dr. R. J. G. Savage.
September 17: Karst topography and hydrology of the Mendips. Leader: Mr. D. I. Smith.

A. B. HAWKINS, *Hon. Secretary.*

REPORT OF ORNITHOLOGICAL SECTION, 1972

AT the 48th Annual General Meeting Messrs. P. J. Chadwick and H. R. H. Lance were re-elected President and Chairman respectively, and Mr. Thomas replaced Mr. Warden on the Committee, Messrs. Ogilvie, Taylor, Lee, Lucas, Bigger, Bland and Pople being re-elected. Mr. Billett was re-appointed Hon. Auditor.

Six indoor meetings were held, with an average attendance of 57. The subjects and speakers were:—

January 12: Birds of Tunisia, by P. J. Chadwick.
February 18: Birds of Finnish Lapland, by A. D. Lucas. (Postponed due to power cuts).
March 8: Fieldwork meeting.
October 18: Feeding Behaviour of Geese, by Dr. M. Owen.
November 22: Birds of Morocco, by Mr. J. D. R. Vernon.
December 8: Waterfowl Identification by a panel.

Eleven Field meetings were organised as follows:—
Burry Inlet (Feb. 20), Steart and Quantocks (Apr. 16), Rainbow Wood Bath (Apr. 28), Brean Down (May 7), Leigh Woods (May 11), Inglestone Common (May 17), Exmoor (June 4), Atlas Survey in Weston-super-Mare area (June 24), Portland Bill and Radipole Lake with Junior section (Sept. 17), Caldicot Moor (Nov. 26), Chew Valley Lake (Dec. 10).

We thank the leaders and helpers on all these occasions. Members of the section also contributed to a number of local and national surveys, including the Nest Record and Ringing schemes, the Common Bird Census, the Birds of Estuaries survey, and the Atlas scheme. Local surveys on the Birds of Bristol, Starling roosts, Birds of Prey, Gulls of the Avon, Shelducks, House Martins, and Rookeries in South Gloucestershire.

H. R. H. LANCE, *Hon. Secretary.*

REPORT OF MAMMAL SECTION, 1972

AT the Annual General Meeting on 7 January, 1972, the following were elected: President, Mr. R. G. Symes; Committee members, Mr. A. F. Jayne and Dr. R. J. G. Savage. The following were re-elected; Secretary, Miss E. J. Lenton; Recorder, Mr. R. G. Symes; Committee members, Miss J. B. Webb, Mr. R. M. Curber, Mr. F. H. Rawlings and Mr. G. Walker.

The following indoor meetings were held during the year, with an average attendance of fifty-two members.

Jan. 7: A.G.M. and members' slides and talks.
Feb. 10: Hippopotami, by Mrs. Shirley C. Savage.
March 17: Grey Squirrels, by Mrs. J. Mackinnon.
Oct. 11: The Marsupials of Western Australia, by Mrs. E. Finch.
Nov. 29: Fruit Bats, by Mrs. C. Bramwell.
Dec. 6: Seacows Today, by Dr. C. Bertram.

Field meetings were as follows:—

Jan. 9: The Avon Valley, Mr. R. G. Symes.
Feb. 6: Fox Spotting. Mr. F. H. Rawlings.
Feb. 13: Badger Survey. Mr. A. F. Jayne.
March 19: Cromhall and Tortworth. Mrs. J. Humphris.
April 21, 28: Badger watches. Mr. A. F. Jayne.
April 30: North Stoke. Miss E. J. Lenton.
May 12, 19: Badger watches. Mr. A. F. Jayne.
May 21: Wetmoor. Mr. A. F. Jayne.
June 18: River Survey. Mr. R. G. Symes.
July 16: 10 km. Square ST 75. Mr. R. M. Curber.
Aug. 13: Tickenham. Mr. G. Walker.
Sept. 24: New Forest. Miss J. B. Webb.
Oct. 6–8: Pembrokeshire. Miss E. J. Lenton.
Oct. 22: Chittening Warth. Mr. F. H. Rawlings.
Nov. 12: Rivers Survey. Miss J. B. Webb.
Dec. 17: Kenn Moor. Mr. G. Walker.

Members have contributed to the Mammal Society's distribution scheme based on the 10 km. squares of the National Grid and to the Section's own distribution maps based on 1 km. squares.

E. J. LENTON, *Hon. Secretary.*

ACCOUNT OF GENERAL MEETINGS, 1972

OUR first meeting of the year on 20 January was addressed by the retiring President, Mr S. M. Taylor on "Patterns in Space and Time".

Feb. 3: Mr. J. Barrett showed his film "Islands of the Bristol Channel" based on six years of visiting and leading parties to the islands of Steep Holme, Flat Holme and Lundy.
March 2: Dr. R. S. Wilson spoke on "Midges and Water Pollution". Dr. Wilson's particular interest is in the midges called Chironomidae—the ones that do not bite.
Oct. 5: The film "The Baobab Tree" was shown. This film is a portrait of the African upside-down tree and its ecology and shows a year's life of a Baobab Tree in Tsaro National Park, Kenya.
Nov. 2: Professor N. W. Hardistry spoke on "The life cycle of the Lamprey".
Dec. 7: "Members' Evening" when short accounts by members of their experiences in various parts of the world included:—
Dr. C. E. D. Smith on Smokey Mountain National Park.
Mr. M. Taylor on Jack Miner's Bird Sanctuary Canadian Border.
Miss B. A. Rake on Organ Pipe National Park, U.S.A.
Dr. J. W. Cowie on Greenland and Arctic Canada.
Miss C. Graham on Native in Tasmania.
Mrs. D. G. Hill-Cottingham on Snippets from Sweden.

AUDREY HECKELS, *Hon. Secretary.*

GENERAL FIELD MEETINGS, 1972

FOURTEEN field meetings were held and with two exceptions were well attended. A new venture, a canal trip, was particularly popular. In addition to the ordinary meetings, four midweek rambles were held, mainly for retired members; they were sufficiently successful to justify their repetition next year. A list of the meetings with leaders an an indication of the things seen is given below. A fuller account is kept in the records of the Field Committee. In the following list the leader is given first followed by the area visited.

Jan. 16: H. G. Hockey. Huntspill national nature reserve. Waders, gulls, duck, and small birds, and signs of otter.

Mar. 4: R. Curber. Studland, nature reserve and Poole Harbour. Waders and other birds.

Mar. 31: H. G. Hockey. Monmouth and Brecon Canal. A 3-mile journey by narrow boat near Govilon with excellent views.

April 23: Miss R. C. Lee. Fingle Bridge. A wooded valley on the River Teign. Dippers, ravens and a raven's nest were seen.

May 3: Mr. and Mrs. G. H. Dudden. Glen Frome from Eastville Park to Oldbury Court, Plants and birds.

May 10: H. G. Hockey. Wrington Hill. Trees, limestone plants, and birds (including a buzzard's nest).

May 14: H. G. Hockey. A 6-mile walk down the valley of the Little Neath to Port Nedd Fechan. Waterfalls, trees, ferns, mosses and birds.

June 8: D. A. C. Cullen. River Chew and Lord's Wood. Evening Bird Song.

June 10: Miss C. Groves. World-wide Butterfly Farm, West Overton, where many species of British and foreign butterflies are bred. East Farm, Hamoon, Sturminster Newton; this is a large dairy farm managed by the owner, Mrs. Hughes, to maintain habitats for wild life.

June: 21: C. B. Carlile. Blaise Castle Woods and Blaise Hamlet. Trees and architecture.

July 3: Miss C. Groves. Leigh Woods and bank of Avon. Plants (including bee and wasp orchids).

July 8: A. F. Devonshire. Forest of Dean. Meering Meend Pools and part of the Wilderness Forest Trail. Forestry and plants.

July 11: Miss R. C. Lee. Canada Coombe and Loxton Hill. Birds and plants of limestone.

Aug. 19: R. Curber. Stanpit Marshes. Shore Birds, including 4 species of tern, water rail, and a hooded crow.

Sept. 10: Mrs. Hill-Cottingham, Kilve; marine biology and use of quadrats. Holford Combe; trees and marsh plants.

Sept. 12: A. F. Devonshire. Ashton Court, including the gardens. Girth measurements were taken of some trees.

Oct. 28: A. F. Devonshire. Bigsweir to Tintern. A walk along the left bank of the Wye (about 4 miles). Autumn colours, trees, ferns and birds.

Dec. 3: Miss R. C. Lee. Canal near Tewskesbury and Frampton Pools. Meadow and water birds.

A. F. DEVONSHIRE, *Hon. Field Secretary.*

REPORT OF THE CONSERVATION COMMITTEE, 1972

NATURAL history surveys were undertaken in the Bristol Avon Valley and these were used in two separate reports. Copies of one report were sent to the four local planning authorities who had issued a pamphlet on the proposed Leisure Park in the valley. Copies of the other report were sent to the Bristol Transportation and Land-Use Study Unit and the South Western Road Construction Unit. This latter report dealt with the damaging effect on local wildlife which will result from the building of a four lane trunk highway along the old Midland Railway Track if the present proposals for the provision of a by-pass road for Saltford are put into effect.

Observations and suggested modifications were sent to Somerset County Council in connection with its proposal to provide a recreational picnic area with car parking and toilet facilities at the Priddy Pools Site of Special Scientific Interest. (S.S.S.I.) Our suggestions will be taken into account when the scheme is finalised.

Our objections, along with those of other bodies, were successfully lodged against the tipping of rubble into woodland at Bury Hill, Winterbourne Down. On our advice, Bristol City Parks Department discontinued the use of public shooting permits for Corporation Estates, and did not proceed with a proposal for a park for mobile caravans to be sited within the area of the nature trail at Ashton Court Park.

A proposal to acquire a fifty foot strip of woodland along the West bank of the River Frome at Stapleton Village for a public space and footpath will probably, at our suggestion, not be followed and the area will remain a private nature reserve.

K. T. BATTY, *Chairman.*

OBITUARY

ARCHIBALD MALCOLM GORDON CAMPBELL

DR. A. M. G. Campbell, consultant neurologist to Bristol Royal Infirmary and physician to the United Bristol Hospitals, died on March 4 at the age of 62. He was educated at St. John's College, Oxford and Guy's Hospital where he graduated B.M., B.Ch., in 1934. He held various house appointments at Guy's and in 1936 he took the M.R.C.P. and in 1938 the D.M.

From 1940 to 1945 he served in the R.A.F. as a neuro-psychiatrist afterwards returning to Oxford to the department of neurology. He then moved to Bristol where he was elected physician to Cossham Hospital and to the Bristol Royal Hospital and the Bristol City Hospital and was appointed lecturer in medicine at the University of Bristol. In 1850 he was elected F.R.C.P.

His professional colleagues have elsewhere written in praise of his attainments in medicine and, in particular, of his work on multiple sclerosis and have referred to the wide importance of his work on the effect of lead on the nervous system, pollution and drug addiction. He has been well-described as one of a diminishing number of physician-naturalists.

The creation of the Jenner Trust and the establishment of the Jenner Museum at Berkeley was almost entirely due to his enthusiasm and effort and was the outcome of his great interest in medical history. In the nineteen-sixties he gave a memorable lecture to our society on the life and work of Edward Jenner.

His other pursuits included classical archaeology and wide interests in natural history although in this field it was undoubtedly ornithology which gave him the keenest pleasure. As well as having a keen appreciation of the pleasures of field work he was thoroughly conversant with the more technical aspects of ornithology including the most recent research.

All those who knew Malcolm Campbell must have admired and appreciated his rare combination of intellect and compassion as well as the great courage he showed in the face of his own increasing disability.

G. SWEET.

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AT 14 MAY 1973

A.—Associate Member. *C.*—Corresponding Member. *H.*—Honorary Member.
*Have contributed Papers to the *Proceedings*.

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BRISTOL BOTANY IN 1972

By A. J. Willis

(Department of Botany, University of Sheffield)

THE first three months of 1972 were milder and wetter than usual, but the spring growth was no earlier than normal, May being a cold month. June was much colder (by 3°C.) than average and was followed by below normal temperatures in July, August and September. Records for Long Ashton Research Station show that the cool summer resulted in a somewhat colder year than average in spite of a warm December, which was 2°C. milder than usual. This mild weather permitted, as in the winter of 1966, substantial overwintering of *Azolla filiculoides* Lam., reported from the Kennet and Avon Canal where it is increasing (*I.F.G.*), and also from Kenn Moor (*A.F.D.*). Total rainfall for the year was 842.8 mm. (33.18 in.), somewhat drier than usual, the period July to October being exceptionally dry, with only about one-third of the normal rainfall; however, February, April and December were very wet months. Although the summer was rather sunless, on average the sunshine hours for the year were very close to normal, March and October being sunny months.

A substantial tally of new records in 1972 stems partly from intensive study of certain 10 km. squares for Flora purposes, and many gaps in the reported distribution of various species have been filled. Of special note is the discovery of *Eleocharis uniglumis* at Windsor Hill, Shepton Mallet, a considerable distance from other North Somerset localities for this plant. Also of great interest is the find of *Corydalis claviculata* at Highbury Hill, very near to its former station of St. Stephen's Hill, near Temple Cloud. Several infrequent species not recorded in recent years have been confirmed as persisting in or near previously reported sites, e.g. *Ceratophyllum submersum* between Brean and Berrow, *Asparagus officinalis* and *Elymus arenarius* at Berrow.

In July 1970, after over 80 years in the Falkland Islands, S.S. *Great Britain* returned for restoration to the dry dock in Bristol (on the south bank of the Avon). Scattered plants growing on 'soil' (largely of decayed wood fragments, rust scales and coal dust) on the decks were reported on by M. C. Smith in 'The Flora of S.S. *Great Britain*' (*Watsonia*, Vol. 9, Part 2, pp. 146–147, 1972). Of the twelve plants recorded, two occur in the Falklands but not in

Britain; these are *Colobanthus quitensis* (Kunth) Bartl. (Caryophyllaceae) and *Empetrum rubrum* Vahl (Empetraceae). Neither of these plants is listed in 'The Adventive Flora of the Port of Bristol' by Cecil I. Sandwith (*The Botanical Society and Exchange Club of the British Isles, Report for 1932*, Vol. X, Part 1, pp. 314–363). Of the other species, five are British and not known in the Falkland Islands and five occur both in Britain and the Falklands. In the latter category is *Scirpus cernuus* Vahl, common in the Falklands but not frequent around Bristol.

In a paper entitled 'A revision of *Weissia*, subgenus *Astomum*. I. The European species' by A. C. Crundwell and Elsa Nyholm (*Journal of Bryology*, Vol. 7, Part 1, pp. 7–19, 1972) reference is made to *Weissia levieri* (Limpr.) Kindb., first reported in Britain from Brean Down; the authors regard this as a 'good species'. An article by E. C. Wallace on '*Tortella inflexa* (Bruch) Broth. in England' (*Journal of Bryology*, Vol. 7, Part 2, pp. 153–156, 1972) notes the occurrence of this moss on Oolite in a wood, Warleigh. It is, however, known from rocks and stones on Oolite in several other sites in North Somerset (J. Appleyard, A Bryophyte Flora of North Somerset, *Transactions of the British Bryological Society*, Vol. 6, Part 1, p.25, 1970).

Dr. R. M. Harley has brought to my notice a *Botanical Pocket-Book*, dated 1800, which has fairly recently been presented to the Library of the Royal Botanic Gardens, Kew, and which belonged to F. Bowcher Wright, F.L.S., who found the peony on Steep Holm. The book is annotated fairly copiously, details being given of the occurrence of plants in Somerset and especially in the region of Compton Martin, Harptree Combe and Paulton, near the home (at Hinton Blewett) of F. Bowcher Wright. The book contains a number of first records of plants in the Bristol district and some of these are cited in J. Rutter's *Delineations of the North Western Division of the County of Somerset*. It is planned to abstract and subsequently report on these annotations.

For many years, J. W. White's *The Flora of Bristol* (1912) has been in much demand, but very difficult to obtain. It is now available as a facsimile reprint, published (1972) by the Chatford House Press Ltd., Bristol. This well-produced reprint of White's classic work is most welcome.

Names of contributors associated with several records are abbreviated thus:

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G: Gloucestershire **S**: Somerset

Blechnum spicant (L.) Roth. Binegar Bottom, **S.**, *I.F.G.*

Asplenium marinum L. One clump in rock crevice, south of the pier, Clevedon, **S.**, *J.F.B.*

Cystopteris fragilis (L.) Bernh. Old workings, Sandford Hill, near Winscombe, **S.**, *I.F.G.;* previously recorded for this area in 1915 (*Miss I. M. Roper*, ms.).

Polystichum setiferum (Forsk.) Woynar. Plentiful in The Warren, above Walton Moor, and at Biddlecombe, near Wells, **S.**, *I.F.G.*

Anemone nemorosa L. Lane near Highbridge, a considerable distance from other localities for this plant, **S.**, *J.A.*

Ranunculus trichophyllus Chaix. In small pool, Ashton Park, **S.**, *C.H.C.*

Aquilegia vulgaris L. One plant, Ashton Hill Plantation, near Failand, **S.**, *C.H.C.*

Ceratophyllum submersum L. Rhine between Brean and Berrow, **S.**, *J.A.* This rare Horn-wort has been previously recorded from Lympsham (White *Flora*, p.528) and from Brent Knoll (1915, *Miss I. M. Roper*, ms.); the present record provides welcome evidence of its persistence in this area.

Meconopsis cambrica (L.) Vig. Several plants, Inglestone Common, **G.**, *Mrs. I. M. Hockey.*

Corydalis claviculata (L.) DC. On Highbury Hill, near Temple Cloud, **S.**, *Mrs. M. Hickmott* (per *R.G.B.R.*). White (*Flora*, pp. 138–9) refers to T. B. Flower's locality of St. Stephen's Hill for this plant, and reports its decline until 1890 and the failure to find it subsequently. Highbury Hill is on the other side of the stream from St. Stephen's Hill, and both are sandstone outcrops with a flora unusual in the Bath district. The present record for Highbury Hill is a most interesting one, and apparently the first made this century indicating the plant's persistence in this area. It is possible that the plant may formerly have had a rather wider distribution and has now disappeared from St. Stephen's Hill itself (the plant has been looked for there unsuccessfully several times, *R.B.G.R.*). *C. claviculata* is very rare in the Bristol district, and the present site is its only station in North Somerset.

Thlaspi arvense L. One plant under hedge in field, Knowle, Bristol, **S.**, *A.F.D.*

Arabidopsis thaliana (L.) Heynh. Rather plentiful as a garden weed, Leigh Woods, **S.**, *T.E.T.B.* Also present in 1971, but not seen previously.

Reseda lutea L. Ashton Park, **S.**, *C.H.C.*

Viola hirta L. x *odorata* L. (*V.* x *permixta* Jord.). With parents, at Sandford Hill, near Winscombe, **S.**, *I.F.G.* Earlier recorded from 'Lyncomb Hill, Sandford' by *Miss I. M. Roper* (*Bristol Botany in 1918*).

Hypericum pulchrum L. Near Barrow Gurney reservoirs, **S.**, *J.A.*

Silene maritima With. Plentiful on sea-cliffs, Church Hill and Wain's Hill, and also on rocks south of the pier, Clevedon, **S.**, *J.F.B.*

Malva moschata L. A white-flowered form, growing together with the usual pink form, adjoining Ashton Park, **S.**, *C.H.C.*

Althaea officinalis L. Still in some quantity above Sheperdine (as recorded by Riddelsdell *et al.* in *Flora of Gloucestershire*), and one plant at Sheperdine, **G.**, *P.J.M.N.*

Geranium pratense L. Roadside, near Weston-in-Gordano, **S.**, *C.H.C.*

G. pyrenaicum Burm. f. A form with white flowers, roadside near Cheddar Wood, **S.**, *P.J.M.N.*

G. columbinum L. Windmill Hill, Churchill, **S.**, *P.J.M.N.* The copy of White's *Flora* annotated by C. I. and N. Y. Sandwith records this plant at Churchill Batch in 1916.

G. rotundifolium L. Hedgebank, Long Ashton, **S.**, *C.H.C.;* also lane at Dean, near Shepton Mallet, **S.**, *J.A.* This plant is scarce in the far south of the Bristol district and White (*Flora*) notes that it is 'unknown in South Somerset'.

Trifolium squamosum L. Several colonies, some small, mostly on the earthen river walls, between Oldbury-on-Severn and Hill Pill, **G.**, *P.J.M.N.* The re-discovery of this plant by C. and N. Sandwith below New Passage is reported in *Bristol Botany in 1920 and 1921.*

Vicia tetrasperma (L.) Schreb. Still at Sheperdine, **G.**, *P.J.M.N.;* also in lane, near Portbury Wharf, **S.**, *A.F.D.*

Lathyrus nissolia L. Bank of rhine, Portbury Wharf, **S.**, *A.F.D.*

L. sylvestris L. Disused railway line, Saltford, **S.**, *I.F.G.*

Potentilla tabernaemontani Aschers. Rocky outcrop in field near Redhill, **S.**, *J.A.;* also persistent in residential area of Leigh Woods by St. Mary's Church, **S.**, *C. G. Trapnell.*

Sorbus torminalis (L.) Crantz. Cheddar Wood, **S.**, *P.J.M.N.*

Epilobium palustre L. Marsh, Windsor Hill, Shepton Mallet, **S.**, *I.F.G.;* also marshy area, Biddlecombe, near Wells, **S.**, *I.F.G.*

Torilis nodosa (L.) Gaertn. Sheephouse, **S.**, *M.A.S.*, and also near the sea wall, Portbury, **S.**, *M.A.S.* and *A.F.D.* Recorded as plentiful, sea-banks below Pill, 1958, *P.J.M.N.*, ms.

Apium graveolens L. Roadside, Theale, **S.**, *J.A.*, a station well inland for this plant.

Berula erecta (Huds.) Coville. Churchill, **S.**, *P.J.M.N.*

Euphorbia lathyrus L. On mound of waste material, Golf Course, Long Ashton, **S.**, *C.H.C.*

Atropa bella-donna L. Widely scattered on recently felled ground, Boxwell, **G.**, *M.J.D'O.;* still in the Blaise Castle Estate, Bristol, **G.**, *P.J.M.N.* Also two plants in the garden of Wells Museum, **S.**, *J.A.*

Hyoscyamus niger L. Several plants on recently felled ground, Boxwell, **G.**, *M.J.D'O.*

Veronica catenata Pennell. In rhine inland of sea-wall, near Portbury Wharf, **S.**, *A.F.D.*

V. chamaedrys L. Several plants with white flowers, Arno's Vale Cemetery, **S.**, *A.F.D.*

Lathraea squamaria L. About 100 spikes growing densely together in the area of the Observatory, Clifton Down, Bristol, **G.**, *P.J.M.N.* This find is of particular interest in relation to its reported restricted occurrence (*Bristol Botany in 1971*) on the Gloucestershire side of the Gorge.

Orobanche minor Sm. Associated with *Trifolium repens* L., Redland, Bristol, **G.**, *R. Mortimer;* also in Ashton Park, **S.**, *C.H.C.*

Stachys arvensis (L.) L. Cornfield at Compton Dando, **S.**, *P.J.M.N.*

Scutellaria galericulata L. By Oatfield Pool, northwest of Potters Hill, **S.**, *J.A.;* also in ungrazed marsh, Stidcote Plat, Tytherington, and ditch, Upper Wetmoor Woods, near Wickwar, **G.**, *G.H.*

Campanula trachelium L. Disused railway line, Saltford, **S.**, *I.F.G.;* colonizing ballast in this area were *Verbascum thapsus* L. and *Chaenorhinum minus* (L.) Lange.

Dipsacus pilosus L. Adjoining the River Frome between Iford and Freshford, **S.**, *E.J.L.*

Cirsium eriophorum (L.) Scop. Abundant in field below Kelston near disused railway line, **S.**, *I.F.G.*

C. arvense (L.) Scop. A number of distinctive plants with slightly lobed leaves, glabrous beneath, with only a few soft spines, together with the usual form, by allotments, Arno's Vale, Bristol, **S.**, *A.F.D.*

Lactuca serriola L. Clarken Coombe, near Long Ashton, **S.**, *C.H.C.* and *A.F.D.*

L. virosa L. Waste ground, Highbridge Station and by the Town Hall, **S.**, *J.A.*

Taraxacum laevigatum (Willd.) DC. Sandford Hill, near Winscombe, **S.**, *V.G.*

Triglochin palustris L. Marshy area, Biddlecombe, near Wells, **S.**, *C. H. Hurfurt.*

Convallaria majalis L. Lane leading to Bodkin Hazel Wood, near Horton, **G.**, *V.G.*

Asparagus officinalis L. Sandy waste ground, Berrow, **S.**, *J.A.;* a welcome confirmation of the continued existence of this plant at Berrow (see White *Flora*).

Ruscus aculeatus L. Near border of wood adjoining Kelston Park, **S.**, *I.F.G.*

Paris quadrifolia L. Bodkin Hazel Wood, near Horton, **G.**, *I.F.G.*, who also reports *Primula veris* L. x *vulgaris* Huds. and abundant *Colchicum autumnale* L. from this wood.

Juncus subnodulosus Schrank. Kenn Moor, **S.**, *I.F.G.;* also abundant in this locality is *Typha latifolia* L.

Luzula multiflora (Retz.) Lejeune. A flourishing colony at the edge of Fishpond Wood, Abbots Leigh, **S.**, *T.E.T.B.* The plant is the form with flower clusters subsessile, var. *congesta* (DC.) Lejeune.

Spiranthes spiralis (L.) Chevall. Windmill Hill, Churchill, **S.**, *P.J.M.N.* Also reported from lawns, Abbots Leigh, **S.**, *T.E.T.B.*, Leigh Woods, **S.**, *M.A.S.*, and Westbury-on-Trym, **G.**, *Miss T. Hamand.*

Neottia nidus-avis (L.) Rich. Wetmoor, near Wickwar, **G.**, *E.J.L.* One plant, Cheddar Wood, **S.**, *P.J.M.N.;* also a single plant on the grass verge, Sandy Lane, Abbots Leigh, **S.**, *T.E.T.B.* White (*Flora*, p.567) refers to the last locality.

Herminium monorchis (L.) R. Br. Again reported from near Brown's Folly, Bathford Hill, **S.**, *E.J.L.*, in 1972. In *Bristol Botany in 1971* it was commented that the only fairly recent record for the plant for the area was from the Combe Down side of Bath in 1938 and 1939, but its occurrence there in 1946 has now been reported (R. Scase, *B.S.B.I. News*, 1972, Vol. 1, No. 2, p.32).

Anacamptis pyramidalis (L.) Rich. One plant only, Ashton Park, **S.**, *C.H.C.;* two plants, Shute Shelve, near Axbridge, **S.**, *P.J.M.N.*

Lemna polyrhiza L. In small quantity in pool, Ashton Park, **S.**, *C.H.C.*

L. trisulca L. Oatfield Pool, northwest of Potters Hill, **S.**, *J.A.*

L. gibba L. Kenn Moor, **S.**, *I.F.G.*

Wolffia arrhiza (L.) Hork. ex Wimm. Wick St. Lawrence, **S.**, *Jeremy White* (per *Miss Jean Webb*). Previously recorded for rhines west and northwest of Kingston Seymour (*Bristol Botany in 1948*).

Scirpus maritimus L. Hill Pill, near the Severn, **G.**, *P.J.M.N.*

S. setaceus L. Damp meadow, Norton Hawkfield, **S.**, *J.A.*

Eleocharis uniglumis (Link) Schult. Within a short distance of a clump of *Eleocharis palustris* (L.) Roem. & Schult., marsh, Windsor Hill, Shepton Mallet, **S.**, *I.F.G.*, det. *Dr. S. M. Walters*. This inland locality gives a substantial extension to the known range of this uncommon plant in North Somerset, as the earlier reported sites (Tickenham, Nailsea Moor, Walton-in-Gordano Moor) are well north of the present station.

Carex extensa Gooden. A large clump behind the sea-wall near Kingston Seymour, **S.**, *R.G.B.R.* This sedge has been earlier reported (1933) from the shore of the Channel at Kingston Seymour (*Bristol Botany in 1938*).

C. pallescens L. Damp field near Barrow Gurney Reservoir, **S.**, *J.A.*, conf. *R.G.B.R.* Previously known for wood near Barrow Gurney 1916 (C. Sandwith in annotated copy of White's *Flora*).

C. disticha Huds. Sandford Hill, **S.**, *I.F.G.;* also a few plants, rhine, near Portbury Wharf, **S.**, *A.F.D.*

Glyceria declinata Bréb. Churchill, **S.**, *P.J.M.N.*

Elymus arenarius L. Sand dunes, Berrow, **S.**, *J.A.* This is a valuable confirmation of the persistence of Lyme-grass at Berrow (recorded from the shore near Burnham in *Bristol Botany in 1919*).

Calamagrostis epigejos (L.) Roth. An extensive clump on ungrazed marsh common land, Stidcote Plat, Tytherington, **G.**, *G.H.*

Agrostis gigantea Roth. Biddlecombe, near Wells, **S.**, *I.F.G.*

Alopecurus bulbosus Gouan. Several places in salt marshes between Hill Pill and Sheperdine, **G.**, *P.J.M.N.*

ALIENS. *Cardaria draba* (L.) Desv. By railway, Batts Bow Bridge, near Huntspill, **S.**, *J.A.*

Erysimum cheiranthoides L. Waste ground, Northwick, near Chew Magna, **S.**, *J.A.*

Sisymbrium orientale L. Hartcliff quarry, near Potters Hill, Lulsgate, **S.**, *J.A.* (conf. *R.G.B.R.*).

Althaea hirsuta L. Near Brown's Folly, Bathford Hill, **S.**, *Mrs. P. Gaynor* (per *E.J.L.*). Although this rare and local plant has been previously reported from the Bath area, the present site represents an extension of its range.

Geranium endressii Gay. One plant on dredged material on bank of rhine, some distance from houses, near Tickenham, **S.**, *A.F.D.*

Impatiens glandulifera Royle. With *Solidago canadensis* L. and *Crocosmia* x *crocosmiflora* (Lemoine) N.E.Br. between Clarken Coombe and Long Ashton Golf Course, **S.**, *C.H.C.*

Melilotus indica (L.) All. Several plants on waste ground, Wick Road, Bristol, **S.**, *A.F.D.*

Duchesnea indica (Andr.) Focke. Edge of wood, Providence, Long Ashton, **S.**, *C.H.C.*, conf. *A. J. Willis.*

Cotoneaster simonsii Bak. One bush on scree, Biddlecombe, near Wells, **S.**, *I.F.G.*

Bupleurum lancifolium Hornem. One plant, in garden at Long Ashton, **S.**, *Miss B. A. Rake* (per *T.E.T.B.*). This occurrence and the one reported last year from Abbots Leigh (*Bristol Botany in 1971*) were associated with the use of imported bird seed, for a 'bird-table'.

Polygonum sachalinense F. Schmidt. Several plants, with *Polygonum cuspidatum* Sieb. & Zucc., Wick Road, Bristol, **S.**, *A.F.D.*

Pentaglottis sempervirens (L.) Tausch. Golf Course, Failand, **S.**, *C.H.C.;* also by track, Sheepway, **S.**, and Wick Road, Bristol, **S.**, *A.F.D.*

Verbascum blattaria L. Waste-tip, Portbury Wharf, **S.**, *M.A.S.*

Galinsoga ciliata (Raf.) Blake. St. Michael's Church, Bath, **S.**, *E.J.L.;* previously reported (*Bristol Botany in 1951*) as spreading in Bath.

Anaphalis margaritacea (L.) Benth. In two sites in Ashton Park, **S.**, *C.H.C.;* also in this area were *Oenothera erythrosepala* Borbás and *Hieracium brunneocroceum* Pugsl.

BRYOPHYTES. Marchantia polymorpha L. Waste ground, Highbridge Station, **S.**, *J.A.*

Polytrichum nanum Hedw. On mole hill above Cheddar Gorge, **S.**, *J.A.* This is the second station for v.c.6, although in the same 10 km. grid square as the first record.

Bryum pseudotriquetrum (Hedw.) Schwaegr. var. *bimum* (Brid.) Lilj. Wet wall near Chew Stoke, **S.**, *J.A.*

I am indebted to all those who have supplied records and helped with these, especially Mrs. J. Appleyard, Miss I. F. Gravestock, Mrs. S. C. Holland, Mr. P. J. M. Nethercott and Captain R. G. B. Roe; I am also grateful to S. R. Forsey of Long Ashton Research Station for the supply of meteorological data.

BRISTOL BIRD REPORT, 1972

COMPILED BY THE EDITORIAL COMMITTEE OF THE
B.N.S. ORNITHOLOGICAL SECTION

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The Year. The above-average temperatures of late 1971 continued until the end of March. January was mild and wet, with S.W. gales and heavy rain around the 19th and 26th. A slightly-oiled Little Auk, blown inland and found at Hanham on the latter date, was one of several 'wrecked' in S.W. England. It died next day at Bristol Zoo. The only real break in the mild weather came when a spell of freezing N.E. winds from the 28th–31st brought some snow (heavy in the north) and night frosts. The year's only notable cold-weather movements were at this time, and Lapwings moved S.W. in thousands. A juvenile Collared Dove seen at Sea Mills on the 29th (JFR) had some tail feathers only just out of their quill tubes—presumably one of a very late brood produced in the mild winter.

February too was mild, dull and unsettled, with rain on most days. There were strong S.W. winds in mid-month, when an Arctic Skua was seen over Weston Bay, and easterlies from the 22nd–26th. The White-fronted Geese and Bewick's Swans wintering at the New Grounds were fewer than usual, and both included low proportions of juveniles, suggesting a poor 1971 breeding season. Many birds of both species left the Estuary early, doubtless a result of the mild winter.

The first week of March was very wet, with some sleet. From the eighth an anticyclone over Scandinavia intensified, causing strong E. winds and night frosts. A dry, warm, sunny spell started on the 14th, with a maximum temperature in N. Somerset of 18·5°C.—a level not to be surpassed until July. The generally warm end to winter and start to spring brought some early nesting activity, and early migrants in small numbers. A Wheatear at Sand Point on March 8, a week earlier than usual, was the first reported to *British Birds*. A Whimbrel at Frampton Pools on the 18th was a month early; one was seen the same day on Lundy. An exceptionally early Turtle Dove seen at the New Grounds on April 1, and found dead on the 4th, was in active wing moult—a process this species normally completes in its winter quarters; so it may have escaped from an aviary rather than being a genuine 'early bird' (MAO).

March was the warmest for eleven years and the sunniest for five, and by its end the season was well advanced. The next three months were most unfavourable, however, and summer was very delayed. The weather was unsettled from March 26 to mid-April; S.W. winds sometimes reached gale force, and many Kittiwakes were seen in the estuary. A large anticyclone west of the country gave mainly cold N. or N.E. winds for the second half of the month, which was the wettest April since 1966, with 50% more rainfall than normal recorded at Long Ashton. A shallow depression on the 19th–30th was accompanied by the arrival of belated summer migrants in large numbers. A wintering Smew lingered at Blagdon reservoir until the 21st—a very late date.

The cool, changeable weather continued in May. It was mainly dry until the 17th, with N. or N.E. winds and cool nights. The final ten days were unsettled; strong S.W. winds, reaching gale force, again swept sea-birds into the estuary, and sightings—mainly off Brean Down and Sand Point—involved Fulmars, Manx Shearwaters in some numbers, Storm Petrels, Skuas, Razorbills and Guillemots. A small 'wreck' of Gannets included birds as far up the estuary as the New Grounds. Several Little Egrets were seen in S. England during the month, and an egret seen over the estuary was probably of this species, as there were few reports of other southern species of heron anywhere in the country.

The dismal weather continued in June, dull, changeable and cool—the average temperature was 3°C. lower than normal. During the first fortnight, heavy rain accompanied fresh or strong S.W. winds, and numbers of sea-birds were again in evidence, including over a thousand Manx Shearwaters off Brean Down. The weather did not improve until July 12, when an anticyclone developed over the country, bringing a warmer, drier period. A major irruption of Crossbills occurred in June, with the main numbers in the north of the country soon after the 10th. By July, sizeable flocks were being reported in S.W. England, including over 150 in Mendip conifer woods. Parties were seen here and there in the district up to the end of the year.

The first week of August was rainy, but from mid-month into October Britain had fine, dry though relatively cool weather, with light or moderate winds, interrupted only by short spells of strong westerlies with heavy rain, around September 8 and again a month later. During the month from mid-August, numbers of Wrynecks were recorded in Britain, including some two dozen in the S.W. Among these were two in Glos., north of our area, on August 26 and 28th, and one near Bath for several days in early September. Over the same period, there were more sightings of Aquatic

Warblers than ever before, including a local one of a bird trapped and ringed at Chew Valley Ringing Station. This was the sixth record of the species in our area, and the seventh individual bird. (The record at Sand Bay in September 1971, involving two birds, was the fifth occurrence and not the sixth as stated in the 1971 Report, although it involved the fifth and the sixth birds.) Although the wind in September was mainly from the east, few rare Old World vagrants were seen in Britain, but one of the few—a Temminck's Stint—spent a week at Chew. There were no local reports of transatlantic visitors, which were also scarce nationally.

The saga of the Danish White Storks can now be concluded (see *Proceedings*, 1972, p.107). The bird that was taken to the Tropical Bird Gardens, Rode, after falling down a chimney at Downside School, left early in September after a year's stay. Sightings in the next weeks in Wiltshire and at Keynsham and Bridgwater could well have involved this bird. It seems to have resumed the extraordinary S.W. migration that had brought the brood to this country, for eventually came a report of its accidental electrocution at Launceston, Cornwall on the 26th (*British Birds*, Feb. 1973, p. 85).

October was dry after the 11th, with rather cold N.E. winds. The wind was variable from the 22nd, and from the 26th a mild airstream from the S. to S.W. covered the country. Although this brought some rain, the total recorded at Long Ashton from July to October was only 120 mm—under 35% of normal—and reservoir water levels were very low. Mud exposed at Cheddar formed an attractive feeding ground for numbers of Snipe and Dunlin. Early in October, Bearded Tits irrupted from the Continent in unprecedented numbers. The first Somerset reports came from Steart and Berrow on the 8th; in the Bristol area the first record was on the 15th, and thereafter small numbers were seen until December.

November started stormy and wet; most of the month was cold with easterly winds. A little snow fell on the 8th, and lay on high ground for a few days. Two very late Common Redstarts were seen at St. George's Wharf on the 12th, and four late Curlew Sandpipers at Sand Bay on the 23rd. Heavy rain from the 27th to mid-December caused some flooding, but December as a whole was relatively mild, although sunshine hours recorded were less than half normal. A passage of Grey Phalaropes from Oct. 20 had produced some sixty records throughout the country by the end of November. When the Section visited Chew Valley reservoir on December 12, one was there to greet the party, and gave good short-range views, both in the water and on shore. Long-tailed Ducks at both Barrow Gurney and Chew Valley resrs., and three separate records of Velvet Scoters —our first since 1964—rounded off the year.

Great Crested Grebes. From June to October, at least twelve dead adult birds were found at Chew Valley, and at least one more at Blagdon reservoir. Two of the former were entangled in fishing line, but the others showed no obvious cause of death. No broods of young were seen at either place; a complete failure to breed has only happened once before at Chew—in 1965, when a very low water level precluded nesting. Autumn counts in 1972 were very low compared with those in recent years. The highest figure at Chew was 205 September, substantially fewer than the peak count of 483 there in September 1971. Until 1972, the autumn peak had exceeded 300 every year since 1967. The failure to breed and the decline in numbers remain unexplained and give grounds for grave anxiety.

Common Birds. Collared Doves continue to increase and spread; records suggest new colonization at Alveston, Thornbury and Congresbury in 1972. Goldcrests have become more and more numerous in recent years—part of a national trend, no doubt due to a succession of mild winters; the B.T.O.'s Common Bird Census Index for the species suggests a six- or seven-fold increase from 1964 to 1971. The local Whitethroat picture is confused; in some places numbers seem to have regained their level before the 1969 crash, but in others the species is still almost absent. We commented in 1969 on an apparent decline in Chaffinch numbers in recent years; this seems now to have been reversed.

Less Common Birds. Besides those mentioned earlier, the following are noteworthy: another Lesser White-fronted Goose; our eleventh White-winged Black Tern; the male Ring-necked Duck summering at Blagdon—according to *British Birds*, the first European record of the species summering; and the continuing presence off Weston of the party of Eiders that appeared there in November 1971.

Correction and Additions. In 1971 we described the nesting of a pair of Red-crested Pochard at Frampton Pools as the first breeding record for Glos.; MAO informs us that the species has bred there since the mid-1960's. We go to great lengths to exchange all records with our neighbours in Glos., and Somerset, but some information still fails to reach us. For example, the Somerset Bird Reports for 1970 and 1971 contain two Firecrest records additional to those we published in those years: single birds at Chew Valley resr., December 20, 1970 and December 5, 1971.

Changes in habits and habitats. A Starling roost has built up on the section of Clevedon Pier isolated from land when part of the structure collapsed in 1970. Breeding of Kestrels in the City of Bristol

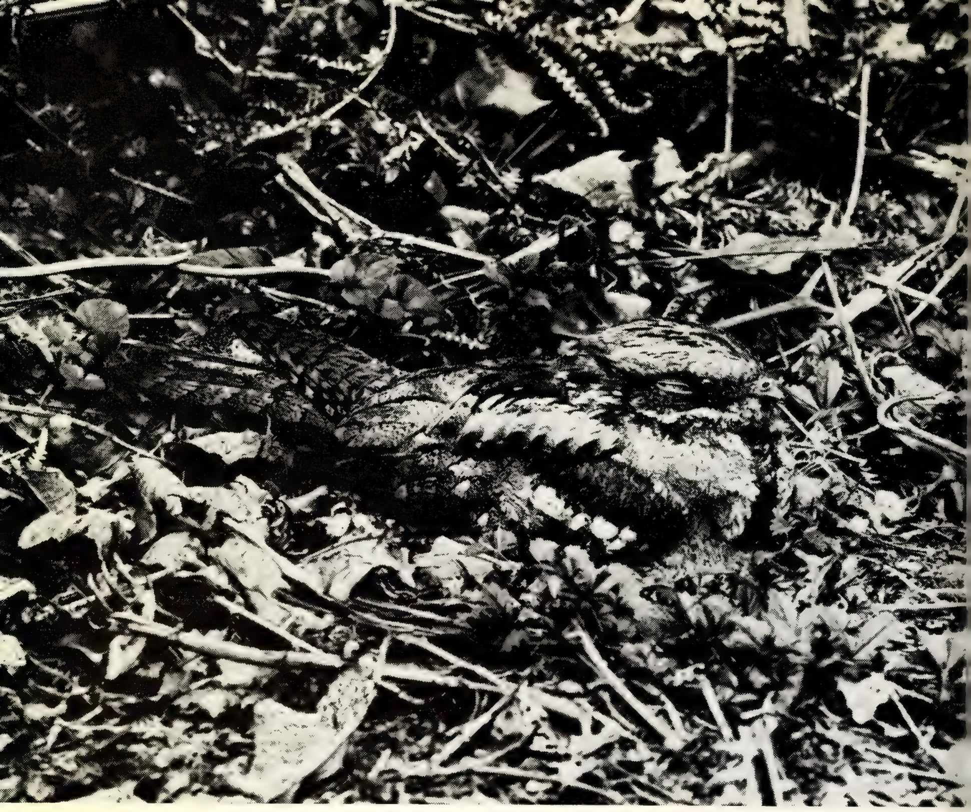
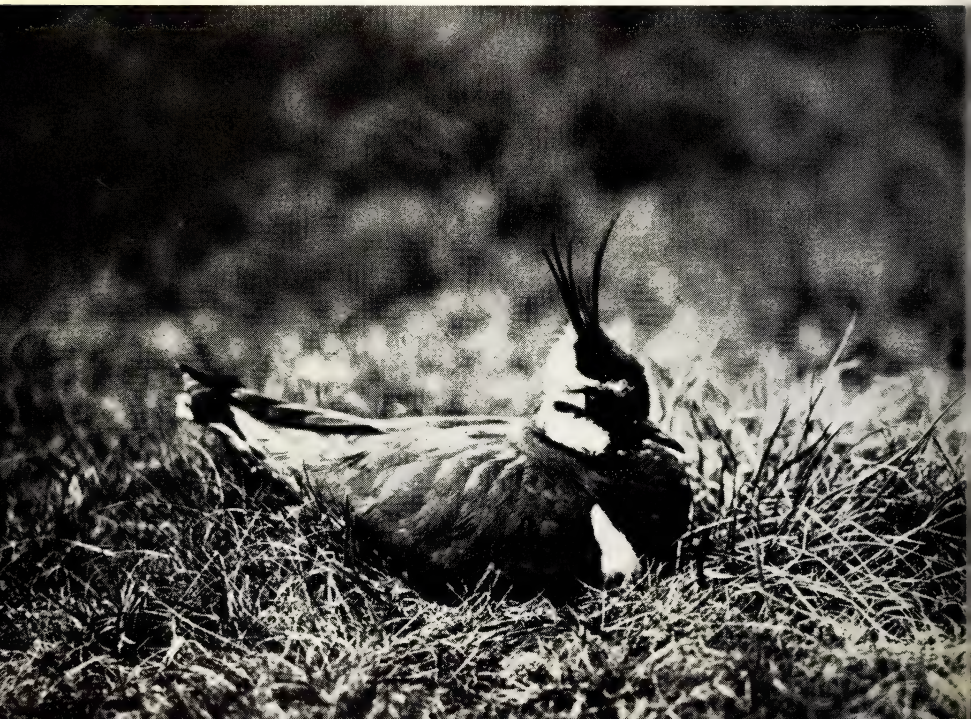


Plate I

Photos by Harry Savory — (*above*) Nightjar on nest, Abbots Leigh, July 10th 1930; (*below*) Lapwing on nest, Ashton Park, May 2, 1931. See page 229



appears to be increasing; pairs bred in two new sites—the University Tower and a bonded warehouse—in 1972, and birds are not infrequently reported hunting over built-up areas. Gulls were recorded breeding on buildings in the city for the first time, both Lesser Black-backed and Herring Gulls being involved.

The commercial extraction of gravel at Frampton Pools ceased in November. Construction of Bristol's West Dock at St. George's Wharf continued. Some species formerly regular there are now seen only further west at Portbury Wharf, but a considerable range of birdlife remains, and shooting, either by wildfowlers or by "marsh cowboys", has been stopped. The countryside is settling down along the route of the M5 motorway with the completion of the major works in the area. Improvements to drainage rhynes, made to handle the rainwater run-off from the motorway, must have a growing effect on the whole drainage pattern of the northern moors. A network of field drainage, using buried perforated plastic piping, was installed in the autumn on a considerable area of Nailsea Moor, with the object of making cultivation possible. This involved the removal of a good deal of the remaining hedgerow-type cover on the moor.

In Retrospect. Publication of the Plate opposite this page was financed from the fund set up in memory of the late Harry Savory. Fittingly, it reproduces two of the collection of his lantern slides given to the Society by Mrs. Savory, and reminds us that he was a master of the art of bird photography. The hen Nightjar brooding in Old Park, Abbots Leigh, on July 10, 1930, is of especial interest in view of the record on page 247. The female Lapwing, nesting in Ashton Park on May 2, 1931, is a sight unlikely to be seen again so close to the City.

A fifty-year-old record by B. W. Tucker emphasises the current scarcity of Barn Owls. On April 27, 1922, he recorded seeing five different birds from the train between Yatton and Nailsea.

The late Dr. D. Munro Smith's diary for May 1914 recorded Lesser Redpolls' nests in Leigh Woods and on Durdham Down. The species has not bred in our area for many years, but it may return soon as it appears to be breeding increasingly in S. Wales.

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The initials **G.** and **S.** denote the parts of the district in South Glos. and North Somerset respectively defined as:

that part of Glos. lying east of the Severn and bounded on the north by the R. Frome from its mouth at Arlingham Bend inland as far as Dudbridge, then by its tributary south to Avening, and then by the A434 road through Tetbury to the Wilts. border; and that part of Somerset bounded on the South by the R. Axe from its mouth to Wookey, and by the B3139, A371, A361 and B3098 roads through Wells, Shepton Mallet and Frome to the Wiltshire border; Brean Down, Steep Holm and The Denny are deemed to lie within the area. From its mouth inland as far as Swineford, the centre-line of the R. Avon is taken as a conventional boundary between **G.** and **S.**; otherwise the political boundary applies.

DIVER *species*

S. One off Brean Down, Apr. 2 (BR)—species not determined.

GREAT CRESTED GREBE *Podiceps cristatus* *See page 228.*

G. Frampton Pools: max. of 25 (Mar. 31); five or six pairs reared six young (TDE, SVRG). One juv., Tortworth Lake, Sept. 3 (JH).

S. No records of successful breeding at Blagdon or Chew Valley resrs., and pair at Emborough had both clutches taken. Pre- and post-breeding season counts at resrs. far below recent years, maxima being 24, Barrow Gurney, Nov. 5; 46, Blagdon, Apr. 13; 61, Cheddar, Jan. 23; and 205, Chew Valley, Sept. 29 (RMC, RNC, SBE, AM *et al.*).

RED-NECKED GREBE *Podiceps griseigena*

S. One, Chew Valley res., Mar. 28 (KEV).

SLAVONIAN GREBE *Podiceps auritus*

S. Bird first reported, Chew Valley res., Dec. 11, 1971, remained until Feb. 14 (GLB, AM *et al.*). Another, Barrow Gurney resrs., Mar. 24, 25 (AHD).

BLACK-NECKED GREBE *Podiceps nigricollis*

S. Single birds, Chew Valley res., Mar. 29, Apr. 9 and Nov. 12 (C *et al.*).

Fulmar *Fulmarus glacialis*

S. Many more records than hitherto; birds reported off coast, Brean Down to Portishead, every month from May to Dec. (39 days). Usually single birds, but up to six off Brean Down and four off Sand Point (RA, TB, BR *et al.*). Two off Steep Holm, June 17 (BLK).

Storm Petrel *Hydrobates pelagicus*

S. Two off Brean Down, May 27—one taken by Herring Gull (RA) —and five off Sand Point on 30th (TB).

Manx Shearwater *Puffinus puffinus* *See page 226.*

S. Reported in Channel every month April to Sept. (18 days); mostly fewer than 20 birds, but considerable movements at times:

	May				June		July	
	26	27	30	31	19	28	2	6
Brean Down	92		415	38	1,015	466		
Sand Point	6	33	16				100	11

Gannet *Sula bassana*

Reported on 34 days, Mar.–Sept. and Nov.–Dec.; mainly single birds, but larger 'wrecks' occurred end-May and mid-Aug. to early Sept.: single birds, New Grounds, May 26, 30th and Chittening on 31st; two, Frampton Pools, May 26–June 2 (BHB, JDS, *et al.*); totals for Sand Point and Brean Down: one, May 26; 26 on 27th, three on 29th, five on 30th, three on 31st; 13, Aug. 15, 17 on 24th, 10 on 28th and eight, Sept. 3 (RA, BR *et al*).

Cormorant *Phalacrocorax carbo*

Up to 47 roosted in trees, Denny I., Chew Valley res., Jan.–Feb., and up to 40, Nov.–Dec.; some also roosted on Steep Holm (no report on size of breeding colony) as birds seen flighting up R. Axe to Cheddar res., where up to 27 reported in Jan. (RA, SMT *et al.*). Other inland and coastal records, usually of one or two birds (JFB *et al.*), but five, Frampton Pools, May 7 (JDS) and ten, New Grounds, Oct. 24 (LPA).

Shag *Phalacrocorax aristotelis*

S. Two off Brean Down, Feb. 16 (BR) and single birds, Sand Point, May 27, Dec. 14 (TB) and Clevedon, Dec. 9 (JFB).

Heron *Ardea cinerea*

S. Breeding records—20 nests, Newton St. Loe; 8 nests, Uphill; and one, Weston Moor, nr. Clevedon (RA, JFB, KTB, RMC) but main heronry at Cleeve not counted. Feeding birds widely reported from resrs., coast and moors and over City of Bristol.

Egret *species* *See page 226.*
S. One in flight off Brean Down, May 17 (BR).

Bittern *Botaurus stellaris*
S. Single birds, Chew Valley res., Jan.–March (two, Feb. 14) and Nov. 5 to end of year (RGT *et al.*).

White Stork *Ciconia ciconia* *See page 227.*
S. One circling over Keynsham with Herring Gulls, gained height and flew off South, Sept. 24 (MS).

Teal *Anas crecca*
Autumn influx late August, with peak for year by end of Sept., when some 1,400 present in N. Somerset (1200, mid-Oct.).

Garganey *Anas querquedula*
G. New Grounds: five (4 ♂♂), Mar. 14 and seven (5 ♂♂) on 21st (LPA); three (2 ♂♂), Apr. 1 and 4th (TDE); and pair, May 29–31 (JDS *et al.*). Four 'probables', Frampton Pools, Apr. 4 (SVRG).
S. Female, Chew Valley res., May 7 and pair, May 29–June 10 (DW *et al.*). One or two, all resrs., autumn, but up to nine, Blagdon, Aug. 27 (PJC *et al.*).

Gadwall *Anas strepera*
G. Frampton Pools: up to 40 by late Jan. but fewer than 20 by end Feb. and max. of 6 or 7, Apr.-May; increase, late Sept., to peak of 60, Oct. 14 (TDE, SVRG, JDS).
S. Max. numbers occurred in autumn: 22, Blagdon res., Sept. 2; 68, Cheddar res., Oct. 15; and 158, Chew Valley, Nov. 5 (when only 16 at Cheddar) and 171 on 6th. 21 broods, Chew Valley.

Wigeon *Anas penelope*
G. Max. counts of 700–750, W.T., Jan. 18–22 (LPA, TDE); pair remained to May 30; another pair, Frampton Pools until June 1.
S. Counts incomplete, but peak seems to have occurred mid-Jan. to mid-Feb. Pair still present, Chew Valley res., May 21 and male spent summer there. Fewer than 500 in area, mid-Dec. and only 600 by end of year (WGB, RNC, AM *et al.*).

Pintail *Anas acuta*
G. Up to 280, W.T. enclosures, Jan.-Feb.; 14, Aug. 28 and then up to 50 in Dec. (MAO). Frampton Pools: 45-50, Jan. 1–26 and 66 on 30th; 28, Mar. 16 and max. of 12 in autumn (LPA, BHB, TDE).
S. Very few noted on coast and moors, Jan. –Apr. (JFB *et al.*). Max. resr. count—25, Cheddar, Jan. 13. Rather more in autumn (first birds—two, Chew Valley res., Aug. 27) with up to ten, Blagdon; 33, Cheddar; and 17, Chew (RMC, AHD, RGT *et al.*).

SHOVELLER *Anas clypeata*

G. W.T. enclosures: max. of 220, Jan.–Feb., and up to 150 in Dec. (MAO). 40, Frampton Pools, Jan. 30 (SVRG); pair, May–June (JDS) and up to 16 in October (TDE).

S. Chew Valley res.: max. *c.* 600, Jan. then approx. 100–120, Feb.–Mar.; four broods, July–August. Marked fluctuations in autumn due to birds moving between resrs., and passage movements: peak of *c.* 350–375, Sept.–Oct. with highest individual res. counts of 345 (one flock), Chew Valley, Sept. 1; *c.* 190, Blagdon, mid-Sept.; 116, Cheddar, Nov. 12; and 36, Orchardleigh, Dec. 24.

RED-CRESTED POCHARD *Netta rufina* *See page 228.*

G. Two nests, Frampton Pools, where species has bred since mid 1960's (MAO).

S. Female, Chew Valley res., Apr. 23–May 19 (PJC, AM *et al.*). Male, Cheddar res., Dec. 2–19 (RMC, SBE) and pair on 31st (AM).

SCAUP *Aythya marila*

G. One, Frampton Pools, Jan. 19; pair, Feb. 15–Apr. 1; two, Dec. 3 (LPA, JDS *et al.*). Male, Littleton Pits, Apr. 2 (JDRV).

S. Regularly reported, Cheddar res.: one male, Jan.–Mar. 17; a male in Oct.; six, Oct. 27 (BR) to mid-Nov. and nine, Dec. 3 (PJC, HWN). Single birds, Barrow Gurney resrs., Feb. 16 (♀), Sept. 16 (♂), Nov. 11–21 (♀) (AHD *et al.*). One male, Blagdon res., Feb. 13, Dec. 3 (SBE *et al.*). Four (one male), Chew Valley res., Apr. 8 (RMC) and two males on 23rd (SBE).

TUFTED DUCK *Aythya fuligula*

G. Frampton Pools: up to 400 by mid-Jan.; 270–280, Feb. to March; decrease to 150, Mar.–April and 50–55, May–June; increase to 100 by end Oct., and 270 by mid-Dec. (TDE, SVRG, JDS).

S. Peak total in mid-Feb., when some 1,050 present. Breeding records from Barrow Gurney, Blagdon and Chew Valley resrs. (50 broods at latter) and R. Avon, St. Anne's. About 475 in area, mid-November to mid-December (RMC, RNC, AHD, HGH *et al.*).

RING-NECKED DUCK *Aythya collaris* *See page 228.*

S. Single male present throughout summer. First noted, Blagdon res., Mar. 26 (SBE) then at intervals at Blagdon and Cheddar to Dec. 17 (PJC, RMC, HWN, BR, GS *et al.*).

POCHARD *Aythya ferina*

G. Frampton Pools: peak counts of 300, Jan. 1 (TDE) and 320, Mar. 5 (JDS).

S. In contrast to Frampton, dispersal was fairly early, numbers falling from *c.* 850, mid-Jan., to *c.* 400 by mid-Feb. Some seven broods, Chew Valley res. Autumn influx from mid-August, with area total 1200, late Nov., falling to *c.* 950 by mid-December.

GOLDENEYE *Bucephala clangula*

Observers' counts differ substantially, but total seems to have been 55 to 65, Jan.–March. First autumn arrivals were two, Chew Valley res., Sept. 22, then very few seen until early Dec., when about 20 in area, with 30–35, mid-month.

LONG-TAILED DUCK *Clangula hyemalis*

S. Two immature birds, Chew Valley res., Dec. 10–12 (many observers); two, Barrow Gurney resrs., Dec. 16–22 and one to end of year (RMC, AM *et al.*).

VELVET SCOTER *Melanitta fusca* *See page 227.*

S. Male, Cheddar res., Dec. 5 and two immature birds on 22nd (BR). Party of four in flight off Sand Point, Dec. 27 (WGB).

COMMON SCOTER *Melanitta nigra*

G. Female, Frampton Pools, Aug. 13–20 (TDE, JDS).

S. Sand Bay: two, Jan. 18, Mar. 18, Sept. 10: three, June 23, July 23 (RA, TB). Weston Bay: max., 36, Feb. 9 (BR), *c.* 20 on 29th, up to 7, Mar.–Apr. one, May to July 1; and seven, Nov. 7 and 14th. Four off Steep Holm, June 17 (BLK). Male, Clevedon, July 15 (JFB). Inland records: three males, Blagdon res., May 7; female, Chew Valley res., May 7; seven males there, July 7 and one male, Aug. 8.

EIDER *Somateria mollissima*

S. Reported from Sand Bay and Weston Bay, every month. Flock of 20 off Sand Point dispersed, mid-May, eleven moving to summer off Brean Down with one there since Feb.: one stayed in Sand Bay. Possible increase in October as 13 off Brean Down on 15th and 8 off Sand Point on 24th, but totals down to 12 and one respectively by November (though four, Sand Bay, on 23rd). Max. of eleven in area in December.

NORTH AMERICAN RUDDY DUCK *Oxyura jamaicensis*

Up to 40–45 in area, Jan.–Feb., and up to 50 in December. Again bred at Chew Valley reservoir (two broods totalling 8).

RED-BREASTED MERGANSER *Mergus serrator*

G. One on estuary, New Grounds, Oct. 17–30 (LPA)

S. Male, Chew Valley res., Jan. 6 (BLK) and single females, Jan. 9 and Nov. 23–Dec. 2 (RMC, AM).

GOOSANDER *Mergus merganser*

G. One, Frampton Pools, Jan. to Feb. 26 (SVRG, JDS *et al.*).

S. Two, Cheddar res., Jan. 1; one on 2nd, and Mar.–Apr. 8 (SBE *et al.*). Party of eight, Blagdon, Jan. 16, and two, Barrow Gurney resrs., Dec. 3 (CCD *et al.*). Chew Valley res.: (monthly maxima)—Jan. (19); Feb. (24); March (13); April (2); Nov. (pair); Dec. (7). Pair off Brean Down, Mar. 4, and off mouth of R. Avon, Nov. 19 (WGB *et al.*).

SMEW *Mergus albellus*

S. Pair, Chew Valley res., Jan.–early Feb. (CCD, RGT *et al*), but four (one ♂), Jan. 15 (RMC); two (♀♀), Feb. 12 and 17th, moved to Blagdon, Mar. 4, where one seen to 25th (SBE *et al.*); one (♀), Apr. 9–21 (JB).

SHELDUCK *Tadorna tadorna*

Coastal survey, breeding season: totals imprecise because of incomplete cover and prolonged breeding season (broods reaching coast, May 28–mid July). Best estimates for (a) New Grounds to R. Avon and (b) R. Avon to Birnbeck I. as follows.

May population: (a) 190–200; (b) 240–260. Total pulli reaching coast: (a) 60; (b) 80–90. Former are similar to 1970 and 1971 figures, but latter indicate a poor breeding season. Pair hatched nine pulli, Chew Valley res., but all vanished within a week.

WHITE-FRONTED GOOSE *Anser albifrons*

G. Total of 1,800, New Grounds, close of 1971, rose to 2,100 by Jan. 6; 2,800 by 21st and 3,350, Feb. 9th—followed by decline to 2,500, Feb. 28 and 1,100, Mar. 2, with number remaining at 535 from 6th–14th; last seen (single bird) on 15th. Only 8·5% young, with max. brood size 2, indicating one of the poorest breeding seasons yet recorded. Autumn arrivals: 20, Oct. 2, then immediate rise to 140 on 5th; 282, Nov. 21; and sharp increase to 738 by 26th, 1,150 on Dec. 14 and 2,000 (40% young) at close of year (WT).

S. Coastal records of one, St. George's Wharf, March 5 (WGB); two, Sand Sand Bay, Oct. 19, and seven, same area, Dec. 20 (RA).

LESSER WHITE-FRONTED GOOSE *Anser erythropus*

G. One adult with *albifrons*, New Grounds, Jan. 22–Feb. 19 (LPA, MAO *et al.*).

BEAN GOOSE *Anser fabalis*

G. One, *A. f. fabalis*, first seen Oct. 1971, New Grounds, present to Feb. 16, and another, Feb. 14–16 (WT); RMC records two, Jan. 29. First-winter bird of Russian race, *A. f. rossicus*, same place, Nov. 30 to Dec. 31 (WT).

PINK-FOOTED GOOSE *Anser brachyrhynchus*

G. New Grounds: up to 14, Jan. 1 to 22nd, with one still there, Feb. 14 (WT); ten flying N.W.–S.E., Sept. 12 (LPA) and one on saltings, Dec. 1–31 (AM, WT).

Dark-breasted Brent Goose *Branta b. bernicla*

G. One, first seen early Dec. 1971, New Grounds, present to Mar. 2, and one, Dec. 14–31 (WT).

S. Coastal record of four, Clevedon, Jan. 10 (CGD).

Canada Goose *Branta canadensis*

G. Frampton Pools: 14 nests, Apr. 27, when some control of breeding pairs again undertaken (MAO); 51 ads. and 16 juvs., June 1 (TDE).

S. Three seen frequently, Chew Valley res., Jan.–Apr., and two, many dates, Apr.–Dec.; no doubt same birds as reported, 1971.

Mute Swan *Cygnus olor*

Breeding records received only for Blagdon and Chew Valley resrs., and Kenn Moor.

Whooper Swan *Cygnus cygnus*

G. Two adults which arrived at the Wildfowl Trust on 29 Dec. 1971, remained there until Jan. 20.

Bewick's Swan *Cygnus bewickii*

G. New Grounds: max. count of 311, Jan. 1; 164 on 12th but 297, Feb. 1; last bird left, Mar. 28; total of 528 different birds during winter, with 11% young; autumn arrivals from Oct. 15 (one bird), herd steadily increasing to 308 by year end; total of 393 individuals seen, with 21% young (WT). 34, Frampton Pools, Jan. 9 (SVRG); six flying up river, Aust, Jan. 30 (PJC).

S. Few winter records: first autumn arrivals—one, Blagdon res., Oct. 15 (same day as bird arrived WT), then small parties noted, Blagdon, Chew, Cheddar resrs.—largest herds being 22, Cheddar, Nov. 26; 23, Blagdon, Dec. 17; and 9 Chew Valley on 31st (GLB, CJ, AM, JAMCG *et al.*).

Buzzard *Buteo buteo*

G. Single birds, New Grounds, North Nibley, Wotton-u-Edge, Cromhall, and nr. Almondsbury, various dates, Feb.–Nov. Two pairs displaying, Little Solsbury Hill, Mar. 22 (RMC); pair near Kilcott, Mar. 28 (RLB) and two birds, Cromhall, Oct. 5 (JH).

S. Bred successfully—two fledged young—at west Mendip locality; Holcombe—where one on keeper's gibbet had been shot—and nr. Bath. Records of up to two in breeding season from other Mendip localities, nr. Blagdon res., Chew Valley res., nr. Wells,Congresbury, Portbury and Abbots Leigh. Autumn and winter records from Chewton Mendip, Chew Valley res., Congresbury, Gordano valley and Failand.

SPARROWHAWK *Accipiter nisus*

G. Recorded all months from Frampton, Cromhall, Acton Turville and Bristol Suburbs. One breeding record received.

S. Breeding season reports widely distributed over N. Somerset including outskirts of Bristol and Bath. Six records of successful breeding. One juv. found dead, Chew Stoke, Sept. 21, with no apparent injuries, sent for autopsy (DW).

HEN HARRIER *Circus cyaneus*

S. 'Ringtail' came in from sea, Sand Point, Nov. 4 (CJ).

HOBBY *Falco subbuteo*

S. Present in four localities during summer. In one of these, two, possibly three, pairs, May–Sept., of which at least one probably bred; may have bred at another site where several reports, May, June and Sept. Single birds in two other former breeding localities. Single birds, Chew Valley res., several dates, May 6 –Sept. 17 (many observers); Sand Bay, June 8 (TB); Portbury Wharf, June 14; Barrow res., June 30; Axe Estuary, July 8 (RA) and Wraxall, Sept. 16 (KLF).

PEREGRINE *Falco peregrinus*

G. New Grounds: one, Jan. 1–Apr. 14 and Oct. 1–end year (WT). One, Chittening Warth, Jan. 8 (JFR).

S. Single birds, Brean Down, Jan. 13, several dates, Mar., Apr. 1 and until 16th, Aug. 5, Nov. 4, Dec. 4, 13, 15 (RA, CJ, BR); Sand Point, Mar. 9, Sept, 26, Oct. 26 (TB); Chew Valley res., Mar. 21 (TB); Stratton-on-the-Fosse, May 28 (MCL) and Stanton Drew, July 17 (RLB).

MERLIN *Falco columbarius*

Single birds, Chittening, Jan. 11, 20; Chew Valley res., Jan. 23, Oct. 22, Nov. 11, Dec. 17; Sand Point, Sept. 13, Oct. 28, Dec. 17; Axe Estuary, Sept. 14; Brean Down, Sept. 28, Oct. 28; Lord's Lot, Mendip, Nov. 14; Stratton-on-the-Fosse, Oct. 4–Dec. 13; Middle Hope, Oct. 31 and Yoxter, Mendip, Nov. 14 (many observers).

KESTREL *Falco tinnunculus* *See page 228.*

Pairs recorded in breeding season from: **G.**—Frampton Pools, Cromhall, Aust, Filton, Stoke Gifford and City of Bristol where two young fledged, University Tower; and **S.**—*Weston-s-Mare, Bleadon, Compton Bishop, Cheddar, *Westbury-sub-Mendip, *Emborough, *Holcombe, *Nettlebridge, Hinton Blewitt, *Farmborough, *Blagdon, *Sand Point, Kenn Moor, Chelvey, Clevedon, *Gordano Valley, Nailsea Moor, Barrow Gurney, *Tyntesfield nr. Wraxall, Ashton Park, *Ashton, Portbury, Portbury Wharf, *St.

George's Wharf, Combe Down and *Widcombe and Wolley nr. Bath. Breeding proved at localities preceded by *. 185 records, all year, from **G.** and 509 from **S.**

Red-legged Partridge *Alectoris rufa*

G. Noted near Marshfield in breeding season.

S. Breeding season records from Odd Down, Hunstrete, Sand Bay and St. George's and Portbury Wharves.

Partridge *Perdix perdix*

Breeding season reports from only five localities; probably an incomplete picture of status.

Quail *Coturnix coturnix*

G. Several heard, Marshfield/Tormarton area, June and July.

S. Single birds heard, Tickenham, May 27 and Priddy Hill Farm, Mendip, July 29.

Water Rail *Rallus aquaticus*

G. Juveniles seen, Frampton Pools, August (SVRG).

S. Breeding season reports from Sand Bay and Chew Valley res., (RA, WGB).

Spotted Crake *Porzana porzana*

S. One, Chew Valley res., Feb. 17 (RSH).

Coot *Fulica atra*

S. Partial albino seen, Cheddar res., Dec. 23 (RMC).

Monthly maximum count at reservoirs: (counts of young bracketed):

	Barrow	Blagdon	Cheddar	Chew Valley
Jan.			2,100	724
Feb.			230	1,148
Mar.		287	25	870
April		333	25	477
May		227	19	
June		316(37)		506(55)
July		1,047(111)		240(30)
Aug.	120	1,165	600	508
Sept.	176	650	1,500	410
Oct.		450	2,000	232
Nov.		420	2,000	275
Dec.	50	250	2,000	520

Oystercatcher *Haematopus ostralegus*

G. Records (20) from New Grounds, Frampton Pools, Severn Beach and Chittening, of up to three birds, Jan., May 12–June 20 and July 30–Oct. 18.

S. Coast: 55 records, all months, mainly from Sand Bay (max. 85, Oct. 31–TB) and Axe Estuary (max. 137, Feb. 12–RA); fewer at Clevedon and Portbury and St. George's Wharves. Reservoirs: up to three, Blagdon, Cheddar and Chew Valley, July 19–Sept. 11; one, latter place, Nov. 5.

LAPWING *Vanellus vanellus*

Only notable cold-weather movement was Jan. 30–31, when large flocks seen moving S., incl. 2,000+, Aust area (PJC). Breeding proved, Cromhall (**G.**) and Blagdon res., Sand Bay and Kenn, Nailsea and Weston Moors (**S.**). Largest flocks—New Grounds: 2,300, Jan.; 2,000–2,600, June 24–July 30; 1,400, Dec. (LPA, TDE); and Axe Estuary: up to 3,000 Jan., and 2,000 Aug. and Dec. (RA, SBE).

RINGED PLOVER *Charadrius hiaticula*

65 reports from **G.**, 70 from **S.** (incl. 19 from resrs.). 48, Sheperdine, Feb. 28 (LPA); two, Frampton Pools, Aug. 13 (BHB).

Monthly peak counts in main areas: (A) New Grounds; (B) Severn Beach–Chittening; (C) St. George's Wharf; (D) Clevedon–R. Yeo; (E) Sand Bay; (F) Weston Bay–R. Axe; (G) Reservoirs.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)
Jan.	8	80			35	35	
Feb.	4	75			32	60	
March		14					
April	5	30	1				2
May	22	200	16	8	60		1
June		30	4				3
July	7	40		16	10		
Aug.	332	750	26	200	600	157	7
Sept.	86	400		200	250	82	14
Oct.	10	250	2			50	8
Nov.	3	100	1		160	42	
Dec.		100			32	70	

LITTLE RINGED PLOVER *Charadrius dubius*

G. Single birds; Frampton Pools, Apr. 16; New Grounds, June 13; Chittening, July 15 and Aug. 10, 11. Four, New Grounds, July 23. **S.** Records of up to three, Cheddar and Chew Valley resrs., Apr. 23–25 and July 10–Sept. 16; one, Portbury Wharf, July 27–Aug. 2.

GREY PLOVER *Pluvialis squatarola*

G. One, Chittening, Mar. 21, and two, New Grounds, May 7 and 21st. 27 records, Aug. 28–Dec. 24 of up to 17 birds, Frampton Pools, New Grounds, Oldbury, Littleton, Severn Beach and Chittening. **S.** Two, Sand Bay, Jan., Feb. (TB); 15 records, Sand Bay, Aug. 10–Dec. 24, of up to 50 birds. Reservoirs: single birds, Cheddar and Chew Valley, late Sept.; Blagdon, mid-Oct. and Chew Valley, Dec. 27.

GOLDEN PLOVER *Pluvialis apricaria*

G. New Grounds: up to ten, Jan.–Feb. 8; one or two, May 23–June 6; present Aug. 13–Dec., with max., 56, Dec. 12 (LPA). Flocks of 100 to S., Aust and 19, Latteridge, Jan. 30. Four, Chittening, Sept. 30.

S. Recorded, coast and inland, Jan. 1–Mar. 4 and July 26–Dec.; max. counts, 50 to N.E., Whitchurch, Jan. 31; 350, Axe Estuary, Jan. and Sept. and 600, Nov. (RA); up to 75, Chew Valley res., spring and 90, autumn; up to 150, Kenn Moor, November.

TURNSTONE *Arenaria interpres*

G. Chittening–Severn Beach: up to 100, Jan., rising to 200 by late April and 400, early May; then fewer than 15 until steady rise from early July to 250–300, Aug.–Dec., with up to 500, early Sept. Up to fourteen elsewhere on coast, Spring and Sept.–Oct.

S. Up to five, coast, Jan.–late May and July 2–Oct. 5 (but 15, Clevedon, May). Chew Valley res.; two, Apr. 30 and one or two, July 30–Sept. 9.

COMMON SNIPE *Gallinago gallinago*

108 reports (incl. 5 from **G.**), from coast, moors and reservoirs, Jan. 1–Apr. 2 and July 13–Dec. 31. Max. counts, Jan.–Mar.: 27, Chew Valley and 160, Cheddar res.; 40, St. George's Wharf; 80, Clevedon coast; 140, Sand Bay; 60, Axe Estuary; 85, Nailsea and Tickenham Moors. Max. counts, Sept.–Dec.: 165, Chew Valley and 200, Cheddar res.; 200, Nailsea Moor and 50, Kenn Moor. Drumming heard regularly, Long Ashton Marsh and Weston Moor, April–August. Breeding proved, Hillsea Moor. (PJC).

JACK SNIPE *Lymnocryptes minimus*

G. Single birds, Aust, New Grounds and Frampton Pools, Jan. 9–May 12; two, latter place, Oct. 19–Nov. 26 and one, Aust, Dec. 24.

S. Up to five, nr. Wells and one or two, Chew Valley res., Jan.–Mar. Single birds, Sand Bay, Mar. 8 and Kewstoke, Apr. 15. One, St. George's Wharf, Oct 22. One or two, Mendip, Nov., December.

WOODCOCK *Scolopax rusticola*

G. Single birds, Inglestone Common, Oct. 22 (APR) and Compton Greenfield, Dec. 3, 9 (NTL).

S. Single birds, Chew Valley res., Feb. 20 (DW); Sand Bay, Oct. 1 (TB); Stock Hill, Mendip, Nov. 2 (JAMCG); Friary Wood, Bath, Nov. 13 (BATH); Avon Gorge, Dec. 2 (RLB).

CURLEW *Numenius arquata*

No breeding records. 69, Littleton on Severn (where large numbers not usual), Jan. 16 (JH). One to E. over Freezing Hill, Bath, Apr. 2 (EJL). One, Lansdown res., Bath, Oct. 29 (RMC).

Monthly peak counts in main areas (for key to letters see Ringed Plover, page 239): (+denotes present but not counted).

	(A)	(B)	(C)	(D)	(E)	(F)
Jan.	205	90	+	38	140	200
Feb.	377	100	+	20	64	120
March	210	100	89	75	63	
April	90	14	2	3	40	
May		1				
June		8				
July	380	230	40	12	90	
Aug.	223	150	150	90	176	
Sept.	184	150	44	10	150	
Oct.	125	76		20	192	90
Nov.		100	12	27	120	
Dec.		141	5		150	115

WHIMBREL *Numenius phaeopus*

Noted, Mar. 18–June 11 (24 reports, incl. 8 from **G.**) and July 1–Sept. 30 (40 reports, incl. 13 from **G.**). Mostly under ten birds, the only counts over 25 being from Brean Down (53, May 14 and 50 on 15th) and Yeo Estuary (28, Aug. 5 and 64, Sept. 30).

BLACK-TAILED GODWIT *Limosa limosa*

Coast: 12 reports (6 from **G.**), Feb. 16–Apr. 11, of up to six birds; 120 to N.E., Sand Bay, Apr. 26 (TB); 39 reports (22 from **G.**), July 6–Nov. 7, mostly of up to 16, but up to 30, Sand Bay, late July, 74, Sand Point, Aug. 24 (TB) and 100–175, Axe Estuary, late Oct., early Nov. (RA, HRH). One or two, resrs., July 26–Sept. 24.

BAR-TAILED GODWIT *Limosa lapponica*

Reports (25, incl. 19 from **G.**), Jan.–May 30 and 34 (half from **G.**), Aug. 6–Oct. 29, coast and resrs., mostly of up to eight birds; but more at Axe Estuary (up to 21, Jan., Feb. Sept., Oct.—RA, HRHL) and at New Grounds (*c.* 100, April and 29, Aug. 8—LPA).

GREEN SANDPIPER *Tringa ochropus*

Twenty-six records (11 in **G.**), Jan.–Apr. 30, and 97 (21 in **G.** and 42 from resrs.), June 30–Dec., coast, moors and resrs., mostly of one or two birds, but up to five, Portbury Wharf and six, Chew Valley res., July–September.

WOOD SANDPIPER *Tringa glareola*

G. Single birds, New Grounds, May 20, July 20–Aug. 16 and Frampton Pools, Aug. 6–7 and Oct. 15 (LPA, BHB, TDE *et al.*).

S. Four, St. George's Wharf, July 16 (WGB) and two, Aug. 8–10 (GAF, JFR). Single birds, Chew Valley res., July 30–Aug. 21 and Oct. 29 (WJH *et al.*); and Cheddar res., Sept. 1 (BR).

COMMON SANDPIPER *Tringa hypoleucos*

Winter records of one or two, coast, resrs. and R. Avon (Sea Mills), Jan.–Apr. 2 and Oct. 22–Dec. Coast, Frampton Pools and resrs.: 27 reports of up to thirteen, Apr. 8–May 21, and 98 reports of up to 25, June 23–Oct. 7. Other inland records: single birds, R. Avon, Bath, Apr. 22 and Newton Park Lake on 30th (RMC); Vassall's Park, May 13 (BLK) and King's Weston Marsh, Aug. 1 (RLB); six, R. Avon, St. Anne's, May 2 (HGH).

REDSHANK *Tringa totanus*

Present all months. Breeding proved, New Grounds, St. George's and Portbury Wharves and Clevedon coast. Peak counts: Jan.–March: 250, Chittening; 60, Clevedon coast and 400, Sand Bay. Autumn peaks: 80, New Grounds, Aug.–Oct.; 250–300, Chittening, July–Dec.; 300, St. George's Wharf, Aug., Dec., and 250, Sept., Nov.; 150, Clevedon, July 15; 180, Woodspring Bay, Aug. 11; 200–220, Sand Bay, Nov.–Dec.; 350, Axe Estuary, Oct. 21. Up to eight, Chew Valley res., June 23–Aug. 10. 115 records (45 from **G**.).

SPOTTED REDSHANK *Tringa erythropus*

G. New Grounds: single birds, May 2 and June 6–24; some 30 reports to Oct. 24, with max. 11, Aug. and 17, Sept., Oct. Chittening: three, July 29 and one, Sept 15.

S. Two, Portbury Wharf, July 15; single birds, there and Sand Bay, many dates, Aug. 1–Nov. 23. Up to three, Chew Valley res., Aug. 19–Sept. 26 and one, Cheddar res., Sept. 2–Nov. 5.

GREENSHANK *Tringa nebularia*

Single birds, Chittening (NTL) and Clevedon (JFB), May 20. Autumn: 55 records, July 9–Oct. 10 (coast) and 30, July 1–Nov. 11 (resrs.), mostly of up to three birds; but up to 12, New Grounds, late July–Aug., and up to seven, resrs., late Aug., early Sept.; three, Chew Valley res., Dec. 19 (CAP).

KNOT *Calidris canutus*

Noted, coast, Jan.–May 9 and July 23–Nov. 25. Fewer than in 1971; only counts of over 40 were from Chittening (where up to 50, Jan.–Apr. and early Aug.), Sand Bay (up to 750, Jan.–Feb. and then under 100) and Axe Estuary (up to 600, Jan.; 1,800, Feb.; 450, March, then under 100).

PURPLE SANDPIPER *Calidris maritima*

Some 25 records, Chittening–Severn Beach, Sand Bay and Brean Down, of one or two birds, Jan.–May 13 and July 9–Dec., with up to five, former area, Jan.–March.

LITTLE STINT *Calidris minutus*

Up to three, New Grounds, Jan.–April 25 (LPA, TDE); one, Chew Valley res., Jan.; three, Sand Bay, Feb 16 (TB). Reports (64), coast and resrs., July 23–Dec., mostly of up to three birds, but up to nine, New Grounds, Aug., Sept. (LPA) and up to seven, Chew Valley res., September.

Temminck's Stint *Calidris temmincki* *See page 227.*

S. One, Chew Valley res., Sept. 12–19 (JRS *et al.*).

Dunlin *Calidris alpina*

Most numerous wader locally. 101 reports from **G.**, and 144 from **S.** incl. 66 from resrs.; 260, Sheperdine, Feb. 28; 19, Kenn Moor, Mar. 12; 250, Aust, Sept. 23; 1,200, Oldbury, Dec. 24.

Peak monthly counts in main areas: (for key to letters see Ringed Plover, page 239). (+ denotes present but not counted).

	(A)	(B)	(C)	(D)	(E)	(F)	(G)
Jan.	700	3,000	19	2,000	4,000	3,000	22
Feb.	700	2,000	480	many	2,500	4,000	10
March	1,500	3,000	35	900	1,500		1
April	158	500	10				1
May	340	500	8	60			3
June	59	40	15		19		
July	700	1,300	35	3			1
Aug.	572	500	30	60			3
Sept.	196	1,000	50	100	80		over 30
Oct.	760	1,500	75	many	400		72
Nov.	1,300	3,000	450	2,000	700	2,500	100
Dec.	+	3,000	1,200	150	920	3,500	130

Curlew Sandpiper *Calidris ferruginea*

Coast: 20 reports, Aug. 1–Oct. 8, mostly of one or two birds; but up to eleven, New Grounds, nine, Severn Beach and three, Sand Bay, early Sept.; four, latter place, Nov. 23 (TB). Reservoirs: up to four, Chew Valley, and two, Cheddar, Sept.; one, latter place, Oct. 29 (PJC).

Sanderling *Calidris alba*

G. Reports (28) from New Grounds and Chittening–Severn Beach. One, former, Jan. 2 (BAO). Up to 35, Apr. 30–June 4 (but 96 at former, May 21 and 71 on 23rd–LPA); up to 23, July 23–Nov. 6 (but 80, Chittening, Aug. 7–NTL).

S. One or two, Weston Bay, Jan., Feb., Dec., and up to nine, Sand Bay, Oct. 11–Dec. (but 38, Nov. 23 and 18, Dec. 28—TB). Passage records: up to 21, coast, Apr. 16–May 28 and Aug. 1–Sept. 9; single birds, Chew Valley res., May 6, 7th and Sept. 23 and Cheddar res., May 30.

Ruff *Philomachus pugnax*

Reports (87, incl. 25 from **G.**), coast and resrs., Jan., Feb., May and July 15–Dec., mostly of up to four birds, but nine, New Grounds, Jan. 30 (LPA) and up to eight, Chew Valley res., September–October.

GREY PHALAROPE *Phalaropus fulicarius* *See page 227.*
S. One, Chew Valley res., Dec. 10–15 (many observers).

SKUA species were noted on 18 dates covering every month from February to September. Besides those detailed below, five were not specifically identified—single birds off Brean Down, Apr. 24, May 30, 31, Sept. 10 and off Steep Holm, July 30.

GREAT SKUA *Stercorarius skua*
S. Single birds off Brean Down, Apr. 6, 9, May 26, 27, 31 and two, June 19 (RA, BR).

ARCTIC SKUA *Stercorarius parasiticus*
G. Dead bird, Severn Beach, May 28 (HGH).
S. Single birds, Sand Bay, Feb. 15, May 27 (TB). Weston Bay: one, Mar. 27, May 14 and 22nd, Aug. 4; and two, Apr. 22, May 12 and on 27th (RA, RAr, JB, BR).

GREAT BLACK-BACKED GULL *Larus marinus*
G. Max. count: 111 on estuary, New Grounds, Dec. 5 (LPA).

LESSER BLACK-BACKED GULL *Larus fuscus*
G. Pair bred on roof of building in centre of City of Bristol (FN).
S. Up to 350 roosting, Chew Valley res., Jan., Feb. and 500 in March (PJC, KEV).

HERRING GULL *Larus argentatus*
G. Adult sitting on nest, Avonmouth Docks, May 30–June 24—presumably unsuccessful (TBS); two pairs reared young on roof tops, City of Bristol (MMPB, DEH, RS, GHW). Nest built on board H.M.S. Flying Fox, Cumberland Basin, was abandoned (RLB).
S. Nested, Brean Down, but eggs taken (BR).

COMMON GULL *Larus canus*
G. Several flocks totalling 600 birds, Leighterton-Tresham area, Mar. 31 (JDRV); flock of 814 on harrowed field, Tetbury, same day (PJC).
S. Up to 3,000 at roost, Chew Valley res., Jan., 5,000 in March and 1,500 in December (DMC, RNC, RGT, KEV *et al.*).

LITTLE GULL *Larus minutus*
S. Recorded every month except June. Cheddar res.—one, Jan. 3–13; up to five (2 ads.) March; four to mid-April and one imm. to 25th; imm., Aug. 12, 13th and adult on 24th; up to four (one ad.) early Sept., then single adults to end of Nov., joined by imms. on

Oct. 24 and Nov. 26. Blagdon res.—six imms., Sept. 5–16. Chew Valley res.—ad., May 7 and two imms. on 11th; one imm., July 31–Aug. 12 and nine together on 28th; single birds, Aug. 30, Sept. 6 and 29th, Oct. 1–5 and on 31st, but two, Sept. 12. Immatures off Clevedon, Feb. 13 and Sand Bay, Sept. 14; and two first-summer birds off mouth of R. Avon, May 12–30.

Kittiwake *Rissa tridactyla*

Noted in every month except October, with considerable movements in Channel off Brean Down and north to New Grounds:

	Feb.	March				April		
	28	26	27	28	31	5	6	29
Brean Down	27		380	90		21	24	
Sand Point		1,029						
Aust					152			
New Grounds					47			22

Also noted on fifteen days off Brean Down in May (max. of 25 on 12th and 24 on 22nd), with single birds also off Sand Point, Clevedon, Portbury Wharf and at Frampton Pools. Most other records were also of single birds, except off Sand Point, where more seen, with max. of 14, Aug. 8 (RA, PJC, BLK, DEP, MGW *et al.*).

Black Tern *Chlidonias niger*

Generally a poor year. Monthly totals given below. Peak autumn passage Aug. 12, when 120 reported (111, Chew Valley res.); also 28 on 13th and 21 on 28th.

April	May	June	July	Aug.	Sept.
1	22	3	21	204	12

White-winged Black Tern *Chlidonias leucopterus*

S. One immature, Cheddar res., Aug. 28 (SBE). Record, accepted by *British Birds* Rarities Committee, is eleventh for district.

Common Tern *Sterna hirundo* Arctic Tern *Sterna paradisaea*

Noted on passage, Mar. 31–June 30 and July 16–Sept. 26. Apparently very small numbers involved, as only six counts of over 20 birds, four of which from New Grounds: 49, Apr. 25; 89, May 3; 22, May 7 and 24 on 20th (LPA, RSH, DVM, WLR *et al.*).

Little Tern *Sterna albifrons*

Noted only in May–six, New Grounds, 23rd (LPA) and one on 29th (GWH) and 30th (JDS).

Sandwich Tern *Sterna sandvicensis*

S. Total of 15 reported. One, Oldmixon, Bleadon Hill, Apr. 7 (DW). Sand Bay: one, Apr. 29 and three, May 30 (TB). Weston Bay:

one, Apr. 30, May 6, 7th, 12th and Aug. 4; three, May 29 (RA, BR *et al.*). Single birds, Portbury Wharf, May 27 (TBS), Chew Valley res., July 30 (PJC).

AUKS were recorded much more often than usual. Besides the four species detailed below, the following were seen too far off Brean Down to be specifically identified: two, Mar. 27 and one on 28th; six, Apr. 5; one, Apr. 6, 9th, 24th, and three on 30th; two, May 14 and 15th; nine on 17th; one on 18th; two, May 26; four on 30th and three on 31st (BR).

RAZORBILL *Alca torda*
G. One, New Grounds, Apr. 2, 3 (LPA).
S. Weston Bay: single birds on six days, Apr. 5–May 18; two, Apr. 2, 15 and June 11 (BR, BES); and parties of five, Apr. 22 (RA), May 7 (PJC). Sand Bay: one, Apr. 8 (SBE), May 28 and single dead birds found, Apr. 12, 14, May 27, 28 (RA, TB). One off Steep Holm, July 1 (BLK).

LITTLE AUK *Plautus alle*
G. One found alive, Hanham, Bristol, Jan. 26, taken to Bristol Zoo, but died on 27th.
S. One, Cheddar res., Nov. 12 (CJ, BR).

GUILLEMOT *Uria aalge*
S. One off Brean Down, Apr. 5; two, May 19 and one, July 7 (BR). One off Steep Holm, May 6 (KLF),

PUFFIN *Fratercula arctica*
S. Adult close inshore, Sand Point, Apr. 8 (SBE).

BARN OWL *Tyto alba*
S. Single birds, Wraxall, Jan. 23 (KLF); Chew Valley res., several dates, Feb., Mar. and Dec. 24 (PJC, RSH, BR *et al.*); 'Mendip', Feb. 26 (KAF); Woodspring Bay, Apr. 11, Nov. 25 (TB, BR); Congresbury, June 21 (WGB); Lower Failand, June 21 (WGB); Tickenham, mid-Oct. (MPH-C) and Whitchurch, Dec. 16 (KEV). Freshly moulted feather found, nr. Wraxall, Apr. 25 (PJC).

LITTLE OWL *Athene noctua*
Reports from at least 29 localities (4 in **G.**) throughout the year—breeding proved in 5 of them. One juv., Chew Valley res., found feeding on corpse of another killed by traffic, July 19 (DW).

SHORT-EARED OWL *Asio flammeus*
G. One, New Grounds, Mar. 14 (LPA)

S. Single birds, Nailsea Moor, from Dec. 30, 1971 to Jan. 2 (HRH); Dolbury Warren, Oct. 1 (TANN); Brean Down, Oct. 22 (BR) and Sand Bay, Oct. 24, 25 and Dec. 9 (TB). One seen during summer.

NIGHTJAR *Caprimulgus europaeus See page 229.*
S. Pair nested, Abbots Leigh, but nest destroyed (CGre); first proof of breeding in Bristol district for twenty years.

SWIFT *Apus apus*
G. Flocks up to 700, Frampton Pools, late May (BHB, TDE).
S. First noted, Brean Down and Chew Valley res., Apr. 30; last seen, Leigh Woods, Sept. 21. Usual large flocks at reservoirs, with 4,500, Chew Valley, May 29; 5,000, June 21; 6,000, July 7; 7,500, on 10th; but only 400, Aug. 17; also 3,000, Blagdon, May 29, up to 500 in June and 750, Aug. 9 (AHD, KEV).

LESSER SPOTTED WOODPECKER *Dendrocopus minor*
Breeding season records from Vassall's Park and Wickham Glen, Bristol (**G.**) and Chelvey, Chew Valley res., Chew Magna, Compton Bishop and Stratton-on-the-Fosse (**S.**).

WRYNECK *Jynx torquilla See page 226.*
S. One in a garden, Combe Down, Bath, Sept. 4–7 (LJW *et al.*).

WOODLARK *Lullula arborea*
G. One, New Passage, Oct. 15 (NTL).
S. Three, Middle Hope, July 19 (TB). One, Ashton Park, June 19 (PJC).

SAND MARTIN *Riparia riparia*
Breeding records from: **G.**—St. Anne's and Bedminster (Bristol) and **S.**—Keynsham and Bath.

RAVEN *Corvus corax*
Reports, all months, of up to four, from: **G.**—New Grounds, Damery and Wotton-u-Edge; and **S.**—St. George's Wharf, Nailsea Moor, Goblin Combe, Hewish, Sand Point, Worlebury, Wavering Down, Loxton, Bleadon, Steep Holm and Brean Down, where pair reared three young.

ROOK *Corvus frugilegus*
G. A complete survey by the Ornithological Section of its area in S. Glos. (see page 230) showed 4,736 nests in 227 rookeries. The portion lying in the Severn Vale, studied since 1933, held 1,144 nests in 66 rookeries—a decrease of 15·1% since 1962.
(Note—the nest total of 1,482 given in the 1962 *Proceedings* should read 1,372. The corrected figure represents a 9·2% decrease since the 1956 survey.) In 1972, as in 1962, most of the decrease has been south of the line Aust–Tockington—JDRV, survey organiser.

Willow Tit *Parus montanus*

Single birds reported from: **G.**—Frampton Pools, Aug. 24 (JDS), and **S.**—St. George's Wharf, June 26 (TBS); Stock Hill Woods, Dec. 13, and Rookham (Wells), Dec. 31 (JAMCG).

Dipper *Cinclus cinclus*

Single birds reported from: **G.**—Willsbridge and **S.**—Monkton Combe (five young reared), Shockerwick and Freshford.

Bearded Tit *Panurus biarmicus* *See page 227.*

G. One or two, Frampton Pools and New Grounds, November (LPA, BHB).

S. Ten, Sand Point, Oct. 15 (RA). Up to seven, Gordano Valley and Chew Valley res., Oct. 15–Dec. 10 (SBE, AM, CEDS).

Ring Ouzel *Turdus torquatus*

S. Eight, Crook Peak, Mar. 31 (TB). One or two, Kenn Moor, Sand Point and Brean Down, Apr. 5–May 7 and Sept. 9–Nov. 5.

Wheatear *Oenanthe oenanthe* *See page 225.*

Reports (63, of which 25 from **G.**) of up to ten birds, from widespread localities, Mar. 8–Oct. 17.

Stonechat *Saxicola torquata*

Sixty-one reports (15 from **G.**), all months, of up to six birds from widespread localities, including successful breeding at Chittening, old airport, Whitchurch, Shute Shelve, Crook Peak and Brean Down.

Whinchat *Saxicola rubetra*

Reports (43), Apr. 11–Oct. 3, from: **G.**—Fretherne, Frampton Pools, New Grounds, N. Nibley, Littleton Warth, Aust, Severn Beach, Chittening and Filton; and **S.**—Bathampton, Saltford, Old Airport, Whitchurch, Nailsea Moor (where breeding proved—HRH), St. George's Wharf, Sand Bay and Brean Down.

Redstart *Phoenicurus phoenicurus* *See page 227.*

Reports of one, sometimes two, from widespread localities, Apr. 16–Nov. 12. Breeding proved: **G.**—Sheperdine; **S.**—Ashton Park, Brockley Combe, Priddy, North Stoke and Lansdown.

Black Redstart *Phoenicurus ochrurus*

G. Single birds, Chittening, Feb. and Dec. 22, and Almondsbury, Mar. 18.

Nightingale *Luscinia megarhynchos*

Singing ♂♂ reported from: **G.**—Frampton Pools, Sheperdine, Tortworth Lake, Alveston, Inglestone Common, Chittening, Compton Greenfield, Filton and Stoke Park (Bristol); and **S.**—Leigh Woods, Ashton Park, Burrington Combe, Chew Valley res., and Bath area, Apr. 15–June 11.

GRASSHOPPER WARBLER *Locustella naevia*

Reports (52) of singing ♂♂ from 30 localities (11 in **G.**). Breeding proved, Long Ashton and Portbury Wharf (**S.**).

AQUATIC WARBLER *Acrocephalus paludicola* *See pages 226-7.*

S. One trapped, Chew Valley res., Aug. 20 (CVRS); 7th record for district.

BLACKCAP *Sylvia atricapilla*

Wintering birds reported from: **G.**—Chittening, Sneyd Park and Redland (Bristol); and **S.**—Abbots Leigh, Worle and Bath.

WOOD WARBLER *Phylloscopus sibilatrix*

Reported from 22 localities (5 in **G.**), Apr. 11–July. Breeding proved, Ashton Park, Brockley Combe and Clevedon Court Wood.

FIRECREST *Regulus ignicapillus* *See page 228.*

S. Single birds, Brean Down, Mar. 17 and Steep Holm, Oct. 7.

PIED FLYCATCHER *Ficedula hypoleuca*

Single birds reported, Apr. 15–May 25, from: **G.**—Frampton Pools, Sheperdine and Henbury; and **S.**—Abbots Leigh, Worlebury, Brean Down, Chew Magna and Monkton Combe (TB, PJC, TBS *et al.*).

TREE PIPIT *Anthus trivialis*

Reports (57) of up to 13 from 25 localities (9 in **G.**), Apr. 9–Sept. 24. Breeding proved, Ashton Park and Chew Valley res. (**S.**).

ROCK PIPIT *Anthus spinoletta petrosus*

S. Inland records of single birds from Barrow Gurney, Cheddar and Chew Valley resrs., Jan.–Mar. 25 and Oct. 9 to end year.

WATER PIPIT *Anthus spinoletta spinoletta*

S. Reports (39) of up to 15 from coast and Barrow Gurney, Cheddar and Chew Valley resrs., Jan.–Apr. 13 and Oct. 28 to end year.

WHITE WAGTAIL *Motacilla alba alba*

S. Up to seven reported from Sand Bay, Brean Down, and Cheddar and Chew Valley resrs., Mar. 17–May 7 and Sept. (RA, SBE, HRHL *et al.*).

GREAT GREY SHRIKE *Lanius excubitor*

S. One, Long Ashton Bypass, Oct. 19 (KTS).

RED-BACKED SHRIKE *Lanius collurio*

S. One, Sand Point, May 9 (TB).

HAWFINCH *Coccothraustes coccothraustes*

Reports of up to six from: **G.**—Inglestone Common and Clifton Down (Bristol); and **S.**—Leigh Woods, Ashton Park, Emborough, Monkton Combe and Rainbow Wood (Bath) (GBB, RMC, BLK *et al.*).

CROSSBILL *Loxia curvirostra* *See page 227.*

Reports of up to 20 from: **G.**—Frampton Pools; and **S.**—Abbots Leigh, Easton-in-Gordano, St. George's Wharf, Cleeve, Sandford, E. Harptree, Blagdon and Chew Valley resrs. and Stock Hill Woods, June 30–Dec. 20. Flock of 150+, latter place, July 30 (PJC).

BRAMBLING *Fringilla montifringilla*

Reports of up to 150 from 31 localities, Jan.–Apr. 8 and Oct. 19 to end year. Visited bird tables regularly, Dursley, Feb. to March and Weston-s-Mare, Jan. to March (D, JB).

SISKIN *Carduelis spinus*

Reports (105) of up to 200 from widespread localities, Jan.–Apr. 22 and Sept. 6 to end year.

REDPOLL *Carduelis flammea*

Reports (117) of up to 30 birds from 46 coastal and inland localities, all months.

CORN BUNTING *Emberiza calandra*

G. Count of 93 singing ♂♂, Marshfield area, June 8 (NJC). Up to four reported, New Grounds, Tetbury, Tresham, Patchway, Tormarton, West Littleton and Cold Ashton, Apr. 8–July 26.

S. Breeding proved, Hinton Charterhouse (PJC). Reports of up to five from Sand Bay, Yoxter Farm (Mendip), Chewton Mendip, Keynsham, Burnett and Lansdown, Mar. 5–Oct. 28.

CIRL BUNTING *Emberiza cirlus*

Reports of one or two from Hawkesbury Common (**G.**), Bleadon Hill, Worlebury and Compton Bishop, Mar. 25–June 25.

SNOW BUNTING *Plectrophenax nivalis*

G. One, Frampton Pools, Nov. 17 (SVRG).

S. Up to three, Sand Bay, Jan. 12 and Nov. 14–Dec. 14 (TB, TBS).

TREE SPARROW *Passer montanus*

Reports (70) of up to 30 birds from 55 localities (15 in **G.**). Flock of 200, Chewton Mendip (**S.**), Jan. 31 (DW).

OTHER COMMON OR REGULARLY OCCURRING SPECIES PRESENT (those marked * are mentioned in the Foreword).

Residents—Little Grebe, Mallard, Greylag Goose†, Pheasant, Moorhen, Black-headed Gull, Stock Dove, Woodpigeon, Collared Dove*, Tawny Owl*, Green and Great Spotted Woodpeckers, Skylark, Carrion Crow, Jackdaw, Magpie, Jay; Great, Blue, Coal and Marsh Tits; Long-tailed Tit*, Nuthatch, Treecreeper, Wren, Mistle Thrush, Song Thrush, Blackbird, Robin, Goldcrest*, Dunnock, Meadow Pipit, Pied and Grey Wagtails, Starling, Greenfinch, Goldfinch, Linnet, Bullfinch, Chaffinch*, Yellowhammer, Reed Bunting, House Sparrow.

Summer or winter visitors or passage migrants: Turtle Dove*, Cuckoo*, Swallow, House Martin, Fieldfare*, Redwing*, Reed, Sedge and Garden Warblers, Whitethroat*, Lesser Whitethroat, Willow Warbler, Chiffchaff, Spotted Flycatcher, Yellow Wagtail.

† Full-winged birds from the Wildfowl Trust are regularly seen elsewhere in the area.

LEPIDOPTERA NOTES
BRISTOL DISTRICT, 1972

BUTTERFLIES

By A. N. Grose

SUNNY and warm days in March were followed by cold, cloudy weather of the spring and early summer. This had an adverse effect on the butterfly population. Many were two or three weeks later in emerging and numbers were down with few exceptions.

Records were received from:—R. Angles, Miss I. F. Gravestoke, R. J. Gregory, A. N. Grose, D. R. Hamblett, B. Harper, J. Humphries, T. and M. Silcocks, J. F. Burton, K. H. Poole.

G and **S** refer to the two vice-counties of West Gloucestershire and North Somerset.

Pararge aegeria (Speckled Wood)
G. and **S.**, fairly common and widespread. Peak Sept. 15 and 17.

Pararge megera (Wall Brown)
G. and **S.**, only seen in small numbers.

Melanargea galathea (Marbled White)
G. Fairly common in usual localities. Kingsweston Down, 96 on July 29.
S. A few only, Goblin Combe, 6 on Aug. 9

Eumenis semele (Grayling)
G. A few only. Dole Bohy Warren, 3 on Aug. 19.
S. A few only. Brean Down, 4 on Aug. 9.

Maniola jurtina (Meadow Brown)
G. and **S.** Fairly common and widespread. Kingsweston Down, abundant July 29. West Littleton, abundant July 14.

Maniola tithonus (Hedge Brown)
G. and **S.** Fairly common in its usual localities. Wetmoor, common on July 20. Portbury, common on Aug. 5.

Coenonympha pamphilus (Small Heath)
G. and **S.** Widespread but in small numbers. Dole Bohy Warren, 45 on Aug. 19.

Aphantopus hyperanthus (Ringlet)
G. and **S.** A poor year, only seen in small numbers, but widespread.

Argynnis selene (Small Pearl Bordered Fritillary)
G. No records received.
S. 1 on July 4 at Sandford Hill. 5 on July 20 at Charterford.

Argynnis euphrosyne (Pearl Bordered Fritillary)
G. Uncommon. 1 on June 2 at Blackpool Bridge, Forest of Dean.
S. No records.

Argynnis aglaia (Dark Green Fritillary)
G. Seen in small numbers. 3 on Aug. 19 at Dole Bohy Warren.
S. Goblin Combe on Aug. 20.

Argynnis paphia (Silver Washed Fritillary)
G. Not uncommon. Blackpool Bridge, Forest of Dean, Aug. 10. Ashton Court, Aug. 27.
S. No records.

Vanessa atalanta (Red Admiral)
G. and **S.** Widespread but in very small numbers.

Vanessa cardui (Painted Lady)
G. and **S.** Widespread but uncommon. Sept. and Oct.

Aglaise urticae (Small Tortoiseshell)
G. and **S.** Fairly common, but numbers down.

Nymphalis io (Peacock)
G. and **S.** Less common than usual.

Polygonia C-album (Comma)
G. and **S.** Widespread but uncommon both spring and autumn.

Limenitis camilla (White Admiral)
G. In small numbers, Forest of Dean Aug. 7 and 24, Dymock Wood Aug. 24, Wetmoor July 28.
S. No records.

Aricia agestis (Brown argus)
G. Only one record, Nailsworth May 31.
S. Clevedon, 1 on June 17.

Polyommatus icarus (Common Blue)
G. In the usual localities, but in small numbers.
S. In the usual places, but in small numbers.

Celastrina argiolas (Holly Blue)
Local in small numbers, most evident in first brood.
G. Arnos Vale May 9 and 18, Blakeney May 18.
S. Sand Point April 5 and 15, Weston May 14, Cadbury camp Aug. 26.

Lysandra coridon (Chalkhill Blue)
G. No records.
S. Brean Down Aug 13, several.

Lycaena Phlaeas (Small Copper)
G. Local and uncommon, Bream, several, May 30.
S. Local and uncommon, Abbots Leigh, Sept 9. Weston Aug. 23 and 30.

Callophrys (Green Hairstreak)
G. Nailsworth, May 31.
S. No records.

Thecla quercus (Purple Hairstreak)
G. Forest of Dean, several Aug. 24.
S. No records.

Strymon W-album (White Letter Hairstreak)
G. Bledisloe, Blakeney July 11, several July 30.
S. Clevedon, 1 July 22.

Leptidea sinapis (Wood White)
G. Symonds Yat, several June 1 and 3.

Pieris brassicae (Large White)
G. and **S.** Widespread, May to September, uncommon.

Pieris rapae (Small White)
G. and **S.** Widespread, May to Oct., fairly common.

Pieris napi (Green Veined White)
G. and **S.** Widespread, April to Sept., fairly common.

Anthocaris cardamines (Orange Tip)
G. and **S.** Reduced numbers in the usual localities, Blakeney 4 on May 27, Abbots Leigh, April 25 to June 3, Sandford Hill, Coalpit Heath June 8.

Gonepteryx rhamni (Brimstone)
Fairly widespread, usual number in the spring, but few in autumn.
G. Cromhall March 16, Bristol Docks Oct. 6, West Littleton July 14, Forest of Dean March 20.
S. Abbots Leigh April 12.

Erynnis tages (Dingy Skipper)
G. Nailsworth May 31, Symonds Yat June 1.

Pyrgus Malvae (Grizzled Skipper)
G. Bream May 30, Blackpool Bridge, Forest of Dean June 2.

Thymelicus sylvestris (Small Skipper)
Very common and widespread.
G. Kingsweston Down 40 on July 29, Wetmoor, many on July 25.
S. Lulsgate 12 on Aug. 12.

Ochlodes venata (Large Skipper)
Common and widespread.
G. Frampton Cotterell July 18, Ashton Court 17 July 11.
S. Portbury July 9, Biddlecombe Wood July 29.

MOTHS

By K. H. Poole

THE following list has been compiled from records received from: Austin Richardson (AA), C. S. H. Blathwayt (CSHB), J. F. Burton (JFB), A. Kennard (AK), and K. H. Poole (KHP). Unless marked * all were noted at light, and were single specimens except where shown otherwise.

Some records received too late for the 1971 notes are included.

Macroglossum stellatarum L. (Humming-bird Hawkmoth), Milton, Weston-s-Mare, July 20* (KHP).

Clostera curtula L. (Chocolate Tip), Saltford, June 3, 1971 (AK).

Drepana cultraria Fab. (Barred Hooktip), Weston-s-Mare, August 29, 30 (CSHB).

Lithosia quadra L. (Four-spotted Footman), Weston-s-Mare, August 19 (CSHB).

Agrotis vestigialis Hufn. (Archer's Dart), Weston-s-Mare, August 23 (CSHB).

Argrotis cinerea Hb. (Light Feathered Rustic), Saltford, May 11, 1971 (AK).

Anaplectoides prasina Schiff. (Green Arches), Weston-s-Mare, July 29 (CSHB).

Hadena genistae Borkh. (Light Brocade) Saltford, June 3, 1971 (AK).

Panolis griseovariegata Goeze (Pine Beauty), Milton, Weston-s-Mare, April 14 (KHP).

Cosmia pyralina Schiff. (Lunar-spotted Pinion), Saltford, July 9, 11, 1971 (2) (AK).

C. affinis L. (Lesser-spotted Pinion), Weston -s-Mare, August 29 (CSHB).

Cucullia chamomillae Schiff. (Chamomile Shark), Weston-s-Mare, April 21 (CSHB).

Plusia gamma L. (Silver Y), Clevedon, October 1 (2)* (JFB).

Ophiusa pastinum Treit. (The Blackneck), Saltford, July 9, 1971 (AK).

Eupithecia pygmaeata Hb. (Marsh Pug), Shapwick, late May—early June* (CSHB).

E. succenturiata L. (Bordered Pug), Weston-s-Mare, July 12 (CSHB).

Zygaena lonicerae Schev. (Narrow-bordered Five-spot Burnet), Clevedon, July 22*. 23* (many), Brean Down, August 13* (JFB).

Chloroclystis chloerata Mab. Cranham, 3 laryae, April 28, 2 moths emerged May 21, 22, (First record for Glos.) (AA).

Procris geryon Hb. (Cistus Forester), Clevedon, Wain's Hill, July 22* (3) 23* (about 20) (JFB). Bathford Hill (Brown's Folly), June 13, 1971* (AK).

ODONATA (DRAGONFLIES)

CONTRIBUTED BY J. M. BOYD

Dragonflies were late this year and due to the weather in reduced numbers.

Agrion splendens Harris (Banded Agrion) Walton Heath, Glastonbury, July 30.

Lestes sponsa Hanseman (Green Lestes) Walton Heath July 30, Westhay Levels Aug. 28, Tealham Moor Aug. 29.

Pyrrhosoma nymphula Sulzer (Large Red Damselfly), same areas as previous years, May 14–July 30.

Ishnura elegans Van der Linden, (Common Ishnura), same areas, June 11–Sept. 10.

Enallagma cyathigerum Charpentier, (Common Blue Dameslfly), Blagdon Lake July 22, Aug. 12; Bathampton July 25.

Coenagrion puella L, (Common Coenagrion), same areas as in previous years, June 7–July 31.

Coenagrion pulchellum Van der Linden, (Variable Coenagrion), Chilton Moor June 11, Ken Moor June 14.

Ceriagrion tenellum Villers (Small Red Dameslfly) Walton Moor, July 30.

Brachyton pratense Müller, (Hairy Dragonfly), Chilton Moor June 11, Westhay Heath June 11.

Aeslina cyanea Müller (Southern Aeslina), Westhay Levels Aug. 28 (3), Oct. 21, Yatton Sept. 10, Kenn Sept. 10.

Aeslina grandis L. (Brown Aeslina), Bathampton July 25.

Aeslina mixta Latreille. (Scarce Aeslina), individuals at Tealham Moor, Draycott Kingstone Seymoor, Sedgemoor July 28–Sept. 24.

Libellula quadrimaculata L. (Four Spotted Libellula), usual areas, May 14–July 11.

Libellula depressa L. (Broad Bodied Libellula), Westhay Heath and Westhay Level, May 14–June 11.

Sympetrum striolatum Charpentier. (Common Sympetrum), usual areas, July 30–Oct. 8.

Sympetrum sanguineum Müller, Blagdon.

Sympetrum danae (Black Sympetrum), one male at Westhay Levels Aug. 28.

HETEROPTERA TAKEN AT LONG ASHTON RESEARCH STATION BRISTOL

By J. A. Wightman

Identification followed Southwood and Leston (1959)

Species		**Hosts**
MIRIDAE		
Monalocoris filicis (L.)	C	*Pteridium* sp.
Deraeocoris ruber (L.)	S	*Urtica dioica*
Orthonotus rufifrons (Fallen)	S	*U. dioica*
Phylus coryli (L.)	C	*Corylus avellana*
Plagiognathus arbustorum (Fabr.)	C	*U. dioica, Heracleum spondylium*
Dicyplurs errans (Wolff)	C	*U, dioica*
Heterotoma merioptera (Scopoli)	S	*U. dioica. C. avellana*
Blepharidopterus angulatus (Fallen)	S	*C. avellana, Acer pseudplatanus*
Orthotylus marginalis (reuter)	S	*Salix* sp.
O. flavosparsus (Sahlberg)	A	*Chenopodium* sp.
O. nassatus (Fabr.)	S	Loganberry
Lypus rugulipennis	A	*Chenopodium* sp. *C. avellana and other plants*
Liocoris tripustulstus (Fabr.)	C	*U. dioica, C. avellana*
Lygocoris pabulinus (L.)	C	Numerous hosts
Calocoris norvegicus (Gmelin)	C	*Convolvulus* sp. *Carduus* sp.
C. sexguttatus (Fabr.)	S	Loganberry
Phytocoris tiliae (Fabr.)	S	*Salix* sp.
P. ulmi (L.)	S	*Vicia faba*
Stenodema calceratum (Fallen)	S	*Holcus lanatus* among *U. dioica*
S. laevigatum	S	*Lolium perenne* among *Salix*
Notostiva elongata (Geoffroy)	C	Grasses among Black Currants
Stenotus binotatus (Fabr.)	C	Grasses among Black Currants
NABIDAE		
Nabis rugosus (L.)		Rank Grasses
CIMICIDAE		
Anthocaris nemorum (L.)	A	Many hosts esp. *U. dioica*
LYGAEIDAE		
Peritrechus lundi	C	
CORIXIDAE		
Corixa punctata (Illiger)	C	On artificial pond. Common
Sigara sp.	S	On artificial pond. Common
NOTONECTIDAE		
Notonecta maculata	C	On artificial pond. Common
GERRIDAE		
Gerris thoracius (Schammel)	C	On artificial pond. Common

A—abundant, C—common, S—1 to several.

BRISTOL MAMMAL REPORT, 1972

By R. G. Symes

ONE of the prime objectives of the Mammal Section has been to record the distribution of the mammals of the Bristol district, firstly on the basis of 10 km squares of the National Grid for the Mammal Society maps (Corbet 1971), and then on a 1 km square basis. Similar mapping has been, and is being carried out on many groups of plants and animals and is very important in producing base-lines for comparison in future years. Some species have now been mapped in all 10 km squares in the Bristol district but the maps based on 1 km squares still show a wide scattering of records and much work remains.

In addition to establishing the presence of a species, members have also contributed other useful information on behaviour, colour varieties, litter dates and sizes, measurements, parasites and trapping results. To meet the needs of those wishing to be more involved in the study of mammals than merely noting grid references the Section produced a new recording card in 1972. This allows more space for recording the type of information outlined above and also for details of habitat.

The Section's field work in 1972 (see Section Secretary's report p. 193) included several river surveys, trapping meetings, and a very successful badger survey (AFJ). In the latter, members surveyed part of 10 km square ST 68, primarily for badger setts but also noting any other species seen. The party covered 9 1 km squares systematically, found 18 badger setts and recorded 10 species of mammals. Trapping for small mammals was carried out on several meetings and where the trapping effort was recorded there were 54 catches in 155 trap nights with Longworth traps, and 35 catches in 140 trap-nights with Flap traps. The Longworths caught 4 species, the Flap traps 5. During a visit to Steepholm in July, 47 mammal traps of various sorts were set for one night, but no mammals were caught. All likely sites for small mammals were searched but no evidence of runs, droppings, etc., was found. It seems safe to assume that rabbits are the only mammal species present (SH, TL).

A great deal of concern was expressed nationally during the year over the status of bats. Results of a survey suggested that organochlorine insecticides could have caused declines in bat populations (Jefferies 1972). Other likely causes were destruction of roosts and removal from buildings. Conservation measures adopted in some areas included installation of steel grills over cave entrances and provision of bat roosting boxes.

494 reports of mammals were received for 1972, this total included 22 new 10 km square records, and 269 new 1 km square records. Check list names and numbers are taken from Corbet (1969), except that the names "ship rat" and "common rat" are preferred as black and brown varieties of both of these species occur.

Thanks for records, newspaper cuttings, and other information go to:—K. Batty, R. Bowerman, A. and J. Buchan, A. Burberry, J. F. Burton, R. Chadwick, D. J. Collier, R. M. Curber, *Daily Telegraph,* C. J. Dallinger, Dr. J. W. Dodson, M. J. D'Oyly, Miss I. F. Gravestock, A. L. Hall, H. R. Hammacott, T. Hardy, S. Harris, Mrs. P. Hill-Cottingham, A. F. Jayne, H. and N. D. Kay, Miss E. J. Lenton, T. Lording, Mrs. E. Magill, J. Milton, Mrs. E. M. Moore, J. Morton, *North Somerset Mercury,* Mr. J. G. and Mrs. S. E. Prince, E. W. Powell, B. Rabbitts, F. H. Rawlings, A. P. Richards, Mrs. E. Robbins, Dr. R. J. G. Savage, T. B. Silcocks, Dr. C. E. D. Smith, E. S. Smith, Miss L. J. Smith, R. E. Stebbings, C. Stratton, *Sunday Times,* R. Surch, Mrs. G. Symes, A. Thomas, R. J. Tucker, Mr. G. and Mrs. A. M. Walker, P. Walker, Miss J. B. Webb, Miss J. Weir, *Western Daily Press,* Mrs. G. A. Winn.

1. HEDGEHOG. *Erinaceus europaeus.* It seemed that hedgehogs were more abundant in 1972 than 1971. Certainly more bodies were recorded on the roads than in the preceding twelve months. 80 reports of hedgehogs were received, 36 being sightings in Bristol. An addition to the Mammal Society map was a new 10 km square record for ST 44 (RGS). 33 records were for 1 km squares from which the species had not previously been noted. Earliest sightings were on 3 (HRH) and 4 (RGS) of January, then none until April. Latest were 4 seen in November, then individuals were seen on 7 (GAW), 8 and 10 (JWD) of December. Two hedgehogs were seen nose to nose in a garden going round in a circle for 45 minutes from 22.30 BST on 2 August and recordings were made of their conversation (G and AMW). This circling is typical courtship behaviour (Morris, 1970). Juveniles were reported on 12 and 19 May and 25 July (RS), 31 August (RGS) and 26 September (LS). The date of the first May litter indicates mating occurred almost before the beginning of April, the gestation period being 30–35 days and the young having been estimated at 2–3 weeks old. One hedgehog seen in a suburban garden was spineless except for a 2-inch circular patch of spines on its back (RS, PW). It is of interest to note that as from 1 April 1972 hedgehogs in Sweden were given special protection as they had become so rare, making it illegal to kill them, or even to move them from one place to another (DT).

2. MOLE. *Talpa europaea.* The description of the inner limits of the mole's distribution in the City of Bristol published in the 1971 report

(Symes 1972) was not challenged apart from one record from Canford Cemetery (RJT). Among records received were 14 from new 1 km squares and new 10 km square records for ST 52 and 53 (RGS). Several bodies of moles were found on Steepholm in July but these were certainly carried over by gulls (SH), there being no recorded population of moles on the island. Matthews (1938) reported finding a dead mole there and he considered it had been transported by gulls or by the tide.

3. COMMON SHREW. *Sorex araneus.* These were caught in Longworth and Flap traps on a number of occasions. Where a teaspoonful of tinned dog food had been added to the traps the shrews survived the night (EJL). There were 16 new 1 km square records and new 10 km square records for ST 44 (EJL, JBW) and 75 (RGS).

4. PYGMY SHREW. *Sorex minutus.* The three reports received were new 1 km square records. Very few reports of this species have come from the Gloucestershire side of the Bristol district.

5. WATER SHREW. *Neomys fodiens.* Only a single record of this species in 1972, one was caught by hand (SH) at Chittening Warth. This was a new 10 km square record for ST 58. It was found under a log in coarse grassland next to a saltmarsh during the Section's field meeting in December. The find was somewhat unexpected as this species is associated with freshwater, and the water near the site was heavily polluted chemically and the mudflats and grassland were very dry (FHR). This species has been recorded previously by the Section, and other workers too, at some distance from any obvious water source.

8. GREATER HORSESHOE BAT. *Rhinolophus ferrumequinum.* Ringed specimens were found dead at Oakford in September (TH) and at Combe Down in May (EJL). That found at Oakford was ringed in January 1971 at Combe Down. It had probably been born in summer 1970 (RES).

11. WHISKERED BAT. *Myotis mystacinus.* One found dead at Combe Down (EJL—ident. RES). A live specimen was caught in a mist net at Abbots Leigh (TBS) on 3 October.

19. PIPISTRELLE. *Pipistrellus pipistrellus.* One found dead at Chilcompton in August (JWD) was about 23–26 days old at time of death (RES).

24. FOX. *Vulpes vulpes.* A new record for ST 75 (EJL) means foxes have been recorded from all 10 km squares in the Bristol district. There were a number of reports of foxes in urban areas, the local

planning committee of Kingswood U.D.C. was told that the invasion of foxes was becoming serious, and the council at Thornbury was told that foxes were getting bolder, raiding dustbins for scraps of food (BEP). Pet rabbits were apparently taken by foxes from hutches at Ashton Vale (BEP) and at Nailsea (NSM). A fox was seen sleeping up a willow tree and one was found decapitated on a railway line (HRH). An adult was heard whining in the entrance to an earth at 13.30 BST on 24 October. It came out of the hole when the observer was about 2 ft. away and bounded off into a thick nettle bed (AJF). The annual fox rally held in Bristol between 0600 and 0730 GMT on 6 February resulted in sightings of only 3 foxes. Because so many sightings in previous years had been on the Downs some members stationed themselves in cars around the edges of the Downs whilst others walked across in a line. However no foxes were flushed from the area. 3 cars circled the Stoke Bishop district and saw 3 foxes.

27. STOAT. *Mustela erminea.* Only five records of sightings were received, very few stoats have been reported in south Gloucestershire.

28. WEASEL. *Mustela nivalis.* Sighted in thirteen 10 km squares, the highest number yet. A record for ST 77 (EJL) was a new record for the Mammal Society map. A report of interest from 1971 received too late for inclusion in last year's *Proceedings* was a litter of 4–5 young found in a nest on 12 July, a parent attacked the observer's dog (RS). Mr. R. G. Williams kindly made the Section some weasel traps which have been set on several meetings.

30. AMERICAN MINK. *Mustela vison.* Recorded from Somerset from 5 10 km squares. Mink have not yet been reported in the Gordano valley. Results of analyses of stomach contents of mink were published by Day and Linn (1972). They showed that mammals formed about a third of the food eaten, with lagomorphs, probably mostly rabbits, forming the most numerous individual mammal item. Rats and field voles were also frequently taken. Birds were taken as often as mammals, the chief order concerned being Ralliformes. Game birds and woodpigeons also appeared important although they could have been eaten as carrion. Other food items were coarse fish (usually cyprinids but no salmonid remains), amphibians, reptiles, crayfish and insects. In Scotland Akande (1972) found that fish (49%) formed the main prey (mostly Salmonidae), birds made up 38% and mammals 23% Ten otter hunts in the country were reported as being also engaged in mink hunting (ST).

31. BADGER. *Meles meles.* Records were received from thirteen 10 km squares with 22 new setts being recorded. Several badgers were unexpectedly seen about in daylight, one was seen in school grounds at 10.00 hrs at Backwell (PHC), and one in office grounds at 10.00 hrs at Westbury-on-Trym (RGS). The latter animal was photographed whilst sleeping in a clump of nettles, it is thought it may have been hit by a car and was concussed. Three badgers were startled outside their sett at 14.30 BST by a Mammal Section field meeting on 30 April. They ran to their sett snarling. Amongst records of badger watches at night, 7 badgers were seen at a sett on 21 April (AFJ). Very few records of breeding success were received. A female found dead on 6 March (MJD) had been suckled on 4 teats, one cub was found dead on 17 June (AFJ), its sett having been bulldozed in tipping operations. Mr. A. P. Richards reported seeing a badger at 1500 GMT on 29 January with what he thought in a fleeting glimpse were 2 very small cubs. He described them as having fairly light silvery grey pelts.

Results of two surveys were published by Dr. Ernest Neal in 1972. These were the results to date of the National Badger Survey (Neal 1972a) and the results of the survey in Somerset (Neal 1972b). The latter included information on relatively few setts in North Somerset and members can actively help by completing questionnaires on all the setts known in the Bristol district.

Badgers in a sett at Dursley refused to leave despite houses being built all around and rubbish, paint, creosote, etc., being tipped down the holes. Four were trapped in cages and removed to vacant setts near High Wycombe (Manfield 1972). There were varied reports of other pressures on badgers in 1972. A dealer was reported to be giving £50 a pelt for making into skirts, waistcoats and evening jackets (ST), whilst another price quoted was £1·25! Dr. Neal was quoted as saying that 1,000 badgers are killed on the roads in Somerset every year, and he also reported that village inns were running badger-feasts as gimmicks. A mill at Chard was stated to turn out 60,000 shaving brushes made with badger hair (BEP) and such brushes were advertised by a London firm at £3·95 each.

Bovine tuberculosis was reported to have been found in badgers in south Gloucestershire, the first recorded occurrence of the disease in badgers in this country (Council for Nature, 1972). Following a joint meeting between officials of the Ministry of Agriculture, Fisheries and Food and representatives of wildlife interests all the badger setts in the area were mapped and monitoring of badgers faeces for the tuberculosis organism (*Mycobacterium bovis*) was undertaken. It was later reported that over 1,000 setts had been found in an area around Dursley and Wotton-under-Edge (WDP).

32. OTTER. *Lutra lutra.* The Section carried out three river surveys as field meetings in 1972. The Mammal Section Committee have asked that otter records for the Bristol district should not be included in this report. A report from Devon of mink killing 4 otter cubs was unsubstantiated. The World Wildlife Fund launched a campaign to save the otter and two Otter Protection Bills were introduced into Parliament but neither survived. The secretary of the eighty-strong Master of Otterhounds Association was quoted as saying "Our three year old ban on the actual killing of otters during a hunt is continuing indefinitely until the otter is truly re-established" (ST).

34. GREY SEAL. *Halichoerus grypus.* Individuals (not sexed) were seen in the sea off Brean Down (BR) and Steepholm (RB, SH). These are new non-breeding 10 km square records for ST 25 and 26 respectively. It is possible that some individuals branded on North Rona, Inverness may appear in the seas in this district,—observers should look for branded letters on the upperside of any seals they see, and note the letter and its position on the body. The Section's field meeting to Pembrokeshire on 6–8 October resulted in sightings on Ramsey Island of about 64 pups, ranging from new born to moulters, and 58 adults. A pup, a bull and 2 or 3 cows were seen at mainland beaches.

47. CHINESE MUNTJAC. *Muntiacus reevesi.* An unconfirmed sighting was reported from Mendip (CEDS).

48. CHINESE WATER DEER. *Hydropotes inermis.* The scepticism expressed in last year's report over the presence of this species at Filton seems to have been unreasonable. Further sightings have been reported and the animal is said to have escaped from a local wildlife park (GAT).

53. BROWN HARE. *Lepus capensis.* This was the most widely recorded species, reports being received from eighteen 10 km squares. Additions to the Mammal Society map were ST 44 and 89 (RGS). Apparent juveniles were reported on 21 August (HRH) and 9 September (RMC).

55. RABBIT. *Oryctolagus cuniculus.* Recorded from fifteen 10 km squares. The farming press claimed that the rabbit population in Somerset was increasing rapidly and that if the position was allowed to go unchecked the countryside could soon be back to pre-myxomatosis days. Ross (1972) considered that rabbits in this country had been dealt a severe but not fatal blow by myxomatosis and they were recovering slowly. If myxoma viruses of moderate virulence continued to predominate and in the absence of widespread development of genetically resistant rabbits, it seemed

likely that the rabbit population would remain considerably smaller than before myxomatosis. Williams *et al.* (1972) demonstrated the existence of latent myxoma virus in rabbits and considered that epizootics of myxomatosis might be initiated from rabbits in which latent myxoma virus had been reactivated. The only case of myxomatosis reported was at Latteridge in February (PW, JM). The continued presence of rabbits on Steepholm was confirmed in July (SH), and on Ramsey Island, Pembrokeshire the field meeting saw a "vast rabbit population". 3 or 4 juveniles were seen in the Bristol district on 18 May (RS) and 3 were seen on 18 June (RGS). Mr. A. F. Jayne reported that a rabbit jumped onto a 3 ft 10 in high wall. Wet paw marks only on the top of the wall confirmed that no other part of the wall was touched.

57. GREY SQUIRREL. *Sciurus carolinensis.* Recorded from thirteen 10 km squares with many reports from urban areas. Squirrels were photographed feeding from a person's hand on Brandon Hill, one was reported stuck in a drain pipe, and one brought traffic on the Centre to a standstill (BEP). A report of a red squirrel at Stapleton in June was probably a grey squirrel in summer coat as no ear tufts were seen. An adult was seen with one juvenile on 8 May (SEP), and there were two reports of adults seen carrying young, on 13 April and 11 May. In the latter instance the young was carried between the forelimbs of the adult (AFJ). Other reports of juveniles were of three seen in June, and one found dead on 16 July. A female found dead on 19 October had been suckled on 5 teats and an immature female found dead in the same locality had a heavy population of *Orchopeas howardi howardi* (Baker) (ident—R. S. George), a Nearctic flea introduced to the country with this squirrel species. It also had a mite which was a species of *Podothrombium* (ident—K. Hyatt) but was neither of two well known British species and has been retained by the British Museum (Natural History). A Nottingham firm offered 5p each for squirrels' tails for making fishing flies. The Agriculture (Miscellaneous Provisions) Act 1972 gave the relevant Minister power to make an order permitting the use of a specified poison in a specified manner in specified areas against grey squirrels and coypus. He did not make such an order in 1972.

59. DORMOUSE. *Muscardinus avellanarius.* A nest found on 31 December has since been confirmed as that of a dormouse. This is a new 10 km record for ST 45 (RS). The nest was found amongst ivy and honeysuckle on a branch of hawthorn. It consisted of shredded strands of bark and leaves woven into a neat ball. The inside of the ball was also lined with bark but this was shredded much more finely. There were mouse-size droppings inside the nest.

61. HARVEST MOUSE. *Micromys minutus.* Thanks particularly to the efforts of Stephen Harris breeding nests of harvest mice were found in 5 areas of Somerset. They were found principally in reeds but full details of the vegetation will be investigated later. Two nests were given to the Bristol City Museum. At one site two persons searching for 2 hours found 3 nests, whilst an apparently promising area at Wetmoor, Gloucs., was searched for 6 man-hours but no nests found. Trapping at some of the Somerset sites resulted in catches of 3 harvest mice in 242 Longworth trap-nights (JBW, EJL, AFJ, RGS, SH, TL). These were the first harvest mice trapped by the Mammal Section, previous records having been from owl pellets and one nest. New 10 km records are for ST 44 (SH, EJL, JBW), 57 (SH) and 47 (SH).

62. WOOD MOUSE. *Apodemus sylvaticus.* Trapped on several field meetings in Longworth and Flap traps. A male wood mouse caught in a Longworth trap in October 1969 died on 16 November, having lived for 3 years 1 month in captivity (RGS).

62. YELLOW-NECKED MOUSE. *Apodemus flavicollis.* Two were trapped in Flap traps in two areas of Lower Wetmoor during the Mammal Section Field meeting in May (AFJ).

64. HOUSE MOUSE. *Mus musculus.* Members reported infestations killed by trapping in several garages and buildings. Ten were trapped in Longworth traps in a flat in Clifton. Two females killed in a food store in February were both pregnant. One had 7 embryos in the right uterus and 1 in the left (all about 5 mm diameter), the other had 5 embryos in the right uterus and 3 in the left (about 18 mm long each) (RGS).

65. SHIP RAT. *Rattus rattus.* Six of the black variety were trapped alive or poisoned in premises in Clifton (RGS).

66. COMMON RAT. *Rattus norvegicus.* Recorded from nine 10 km squares, ST 54 and 44 (JBW) being new records.

67. BANK VOLE. *Clethrionomys glareolus.* Trapped at a number of localities, new 10 km records being for ST 44 (EJL, JBW), 58 (FHR) and 68 (AFJ).

68. WATER VOLE. *Arvicola terrestris.* Records from three 10 km squares only although that from ST 66 was a new addition to the Mammal Society map (EJL). One was seen repeatedly diving with dead stalks of grasses (EJL), presumably for use in nest building.

69. SHORT TAILED VOLE. *Microtus agrestis.* Besides trapping results and identification from traces, records were from skulls in kestrel and barn owl pellets. A juvenile was caught by hand on 10

June (EJL) and a nest was found with two well-grown dead young on 19 September (HRH).

77. LESSER RORQUAL. *Balaenoptera acutorostrata.* A whale of this species came ashore on 24 October 800 yards (720 metres) north of the Severn Bridge at Beachley. It was reported as 15 ft (4·5 m) long (JFB). Up to 1969 106 strandings had been reported on the British Coast since 1913 (Fraser 1969). The last published report of a stranding of a lesser rorqual in the Severn Estuary was at Awre, Gloucestershire, 24 miles above Avonmouth in 1943 (Fraser 1953). When a whale was stranded at Littleton Pill in 1885 it was "visited by many thousand people, for whose accommodation special trains were run by the Midland Railway Company" (Wilson 1885). The lesser rorqual, or piked whale, is a whalebone whale and a characteristic feature is a white patch on the outer side of the flipper (Fraser 1969).

— MONGOLIAN GERBIL. *Meriones unguiculatus.* A female of this species, which is also called the clawed jird, was caught by a cat in a suburban garden at Westbury-on-Trym on 31 May (Dr. Miller). Gerbils of this species were first introduced to this country in 1935 and have been widely adopted as laboratory animals and as pets. It is thought that this specimen was one of a surplus litter of 6 reported to have been released in that locality.

— GOLDEN HAMSTER. *Mesocricetus auratus.* A female was trapped alive at Avonmouth in the hold of a ship carrying wheat loaded at Kaliningrad, USSR. Identification was difficult as it was an albino. It was at first thought to be a European hamster (*Cricetus cricetus*) but on later examination Mr. F. P. Rowe identified it as a Golden Hamster. There have been previous reports of feral golden hamsters in this country (Rowe 1968) but this is probably the first to be recorded from a ship.

— WALLABY. (Species unknown). A wallaby, believed to have a cub in her pouch escaped from a wildlife park at Chard in April. No news of recapture was heard. Yalden and Hosey (1971) submitted that as Bennett's wallabies (*Macropus rufogriseus*) had been living ferally in this country for 30 years, longer than feral mink or the edible dormouse (*Glis glis*), they should be added to the British mammal list.

34 species of mammals were recorded in the Bristol district in 1972. No polecats have been found since that reported last year. Several members sent in reports of unidentified bats seen in flight, these are useful and may help in locating roosts. Members are urged to note all mammals seen in 1973 and to especially record details of litters and any interesting observations. If any unusual

specimen is found it should be photographed, drawn or carefully preserved.

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THE LICHEN FLORA OF THE LEAD MINES AT CHARTERHOUSE, MENDIP HILLS

By D. H. Brown
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FOR a period of some 1,800 years the parts of the Mendip Hills where galena occurs in the Carboniferous Limestone have been subjected to the influence of lead mining and smelting. The first evidence of such activity at Charterhouse is a Roman lead 'pig' dated about AD 49; the final date for lead smelting at this site is 1878 (Gough, 1967). During the final stages only resmelting of lead slag from earlier periods occurred and it is probable that the vitrified slag which is commonly found has been smelted at least three times. This industrial activity has had a marked effect on the vegetation of these regions and in particular the lichen flora. The soil in some places is rich in the potentially toxic minerals of lead and zinc and certain higher plants, e.g. *Minuartia verna*, *Silene maritima*, *Thalspe alpestre*, occur exclusively in these regions.

In the area to be considered here, the Somerset County Council Blackmoor Educational Nature Reserve (O.S. 31/506561), evidence of mining and smelting activity exists, although only the refuse from the latter is lichenologically important. As well as considering the lead slag flora in some detail, including chemical analysis of lichens and soil, lists are included of lichens from natural habitats within the nature reserve and these are representative of the vegetation of the surrounding Mendip plateau.

The lichen nomenclature used follows Duncan (1970). Species marked with an asterisk (*) were not recorded by Watson (1930 and 1953). Soil lead and zinc values are of material soluble in 0·5N acetic acid. Total lead and zinc values in lichen material were obtained by wet digestion of 50 mg washed and oven dried lichen in 2ml Aristar nitric acid, dilution to 5ml with deionised water followed by filtration, using glass-fibre filter paper. Estimation of both metals was by atomic absorption spectrophotometry and the results are recorded as parts per million (ppm) in air dried material.

Observations

LIMESTONE ROCK

Caloplaca aurantia
C. citrina
C. heppiana
C. holocarpa
Catillaria chalybeia
C. lenticularis
Collema auriculatum
C. crispum
C. tenax
Lecanora campestris
L. calcarea
L. contorta
L. crenulata
L. dispersa
L. prevostii
*_Lepraria incana_
(_L. crassissima_)
Lecidea stigmatea
Leptogium sinuatum
Physcia adscendens
P. caesia
Placynthium nigrum
Protoblastenia immersa
P. monticola
P. rupestris
P. rupestris var. calva
*_Rhizocarpon umbilicatum_
Rinodina bischoffii
Solenopsora candicans
Thelidium decipiens
Verrucaria dufourii
V. hochstetteri
V. muralis
V. nigrescens
V. sphinctrina
V. viridula
Xanthoria parietina

Only fairly small outcrops of limestone occur within the area studied. A search of the limestone walls was also made but the flora of the two areas is hardly different. The species recorded are all commonly found on basic rocks subjected to mild atmospheric pollution. Some species, e.g. _Collema auriculatum_ and _Physcia adscendens_ occur on moss as well as rocks whilst _Collema tenax_ also grows on soil. The records for _Lepraria incana_ in this and other habitats are new to vice-county 6 but represent merely a clarification of terminology since Watson's lists. _Lepraria crassissima_ is only provisionally identified being a depauperate specimen.

CALCAREOUS SOIL

Bacidia sabuletorum (on moss)
Baeomyces rufus
Cladonia chlorophaea
*_C. conista_
C. furcata subsp. _subrangiformis_
C. impexa
C. rangiformis
Cladonia pocillum
C. tenuis
Diploschistes scruposus
Dermatocarpon hepaticum
Parmelia physodes
Peltigera polydactyla
P. rufescens

The above species have been recorded from soils overlapping calcareous rock and supporting a calcareous flora. Certain species of _Cladonia_ are exclusively calcareous, e.g. _C. furcata_ subsp. _subrangiformis_ and _C. pocillum_, others are primarily associated with peaty or acidic soils, e.g. _C. impexa_ and _C. tenuis_. These species occur together sporadically in certain sparsely vegetated areas and this admixture may reflect either local patches of leached or acidic soil within the generally neutral to alkaline soil (usual pH 6·3–7·5) or may be related to the high natural lead content of these particular soils. These mixed acid-alkaline assemblages frequently occur with *Minuartia verna* which has always been found to be associated with high soil lead levels in this district. Thus, for example, limestone scree with *M. verna* had a lead content in the soil of 13,200 ppm compared with 1,980 ppm from more normal calcareous grassland; the values for zinc were 230 ppm and 110 ppm respectively. *Baeomyces rufus* may also be an indicator of similar conditions as it is found, usually sterile, in these calcareous areas as well as under *Calluna*.

ACIDIC SOIL

Baeomyces rufus
Cladonia fimbriata
C. floerkeana
Cladonia pyxidata
C. tenuis
Lecidea granulosa

The above lichens were found under *Calluna* and reflect the acidic nature of the soil (pH 4·2) which is probably a silty deposit of the Nordrach series overlying the carboniferous limestone. The soil is not particularly rich in lead (840 ppm) or zinc (10·5 ppm).

EPIPHYTIC LICHENS ON DECIDUOUS TREES

*_Cetraria chlorophylla_
C. glauca
Cladonia fimbriata
C. macilenta
Evernia prunasti
Graphis elegans
G. scripta
Lecanora chlarotera
L. conizaeoides
L. expallens
Parmelia caperata
*_P. exasperatula_
P. glabratula
P. physodes
Parmelia saxatilis
P. subaurifera
P. sulcata
P. tubulosa
Parmeliopsis ambigua
Pertusaria albescens var. _corallina_
P. amara
P. pertusa
Physcia adscendens
Ramalina farinacea
R. fastigiata
Usnea subfloridana
Xanthoria parietina

To the north of the nature reserve is a small mixed deciduous wood of *Acer*, *Alnus*, *Fagus*, *Fraxinus*, *Quercus*, *Salix*. Single trees of *Acer*, *Alnus*, *Fraxinus* and small clumps of *Salix* also occur. All trees have lichen epiphytes and there is very little difference in the flora on different genera of trees. Greatest abundance of lichens occurs on *Alder* and *Fraxinus* and least on *Fagus*, the former consisting mainly of foliose and fruiticose species whilst the latter supports a higher proportion of crustose species on its smoother bark. The commonest crustose species on all trees is *Lecanora conizaeoides*, which is found most abundantly in regions where the atmosphere is polluted with sulphur dioxide (SO_2). However the presence of SO_2-intolerant species such as *Parmelia caperata*, *P. exasperatula* and *Usnea subfloridana* on isolated trees indicates that this area is not particularly polluted and would be placed at zone 7 on the qualitative scale proposed by Hawksworth and Rose (1970), equivalent to a winter mean of between 35 and 40 μg SO_2/m^3. This value may be an underestimate of the SO_2 content of the atmosphere as most of the isolated trees are partially protected from the prevailing wind by being in the valley. *Usnea subfloridana* is much commoner within the wood where the SO_2 levels may be lower. Both *Parmelia caperata* and *P. exasperatula* are only occasionally found and then at either the base of the tree trunk or within the canopy. The record of *Parmelia exasperatula* is probably the most western in England.

EPIPHYTIC LICHENS ON DECORTICATE WOOD

Calicium abietinum
Catillaria griffithii
**Cladonia coniocraea*
**C. digitata*
C. fimbriata
Evernia prunastri
Lecanora expallens
**Lepraria incana*
Parmelia glabratula
P. physodes
P. sulcata
Petrusaria amara

The above list of epiphytes were found on a decorticate tree stump, probably of *Crataegus*, in the area of old slag heaps.

LEAD SLAG

**Buellia stellulata*
Candelariella vitellina[a]
**Lecanora intricata* var. *soralifera*[a]
L. polytropa[a]
Lecidea coarctata
L. lucida/*Coniocybe furfuracea*[s]
L. tumida[a]
Parmelia glabratula var. *fuliginosa*
Rhizocarpon obscuratum
**R. oederi*[a]
R. geographicum[a]
**Stereocaulon dactylophyllum*
**S. nanodes*[a]
**S. pileatum*[a]
S. vesuvianum

(a—most abundant species; s—sterile and indistinguishable in this form).

All the lichens found on lead slag are unique to this habitat in this area and are normally found on siliceous rocks. The same assemblage of species has been found on the lead slag near Priddy (O.S. 31/545505) and near East Harptree (O.S. 31/555548) but not in quite the abundance as at Charterhouse. It is surprising that such a conspicuous and distinctive lichen flora was overlooked by earlier lichenologists, the more so since it appears that Watson (1930) had a record from the "Mineries above Harptree Combe, Mendip". Although unlikely, it is just possible that the species representing new vice-county records may have colonised the area since Watson's time. Kershaw (1963) noted that, like *Lecanora conizaeoides*, *Stereocaulon pileatum* appears to be colonising urban habitats where sulphur dioxide pollution has reduced the competition from pollution-sensitive species. This species has recently been found in Bristol. At the same time Kershaw indicated that as well as occurring in its traditional montane or sub-montane habitats, *Stereocaulon pileatum* was also found on "spoil heaps near, for example, old iron-workings". In his diagram, however, he still does not mention the Somerset localities.

Two types of lead slag are present at Charterhouse: vitrified (glassy) with either a wrinkled or fractured surface and a more porous and granular type, which was probably not re-smelted during the last period of activity. No differences in the lichen flora on these two types of slag has been detected. In the case of the vitrified material, most lichens grow over the smooth surface although *Candelariella vitellina* grows in the cracks and between wrinkles. The lichens, probably mainly *Stereocaulon* sp., are capable of pitting the surface of the vitrified slag and the same pitting phenomenon has been observed (Mellor, 1923) with lichens growing on stained-glass windows.

SOIL ON SLAG HEAPS

Bacidia lignaria
**Cladonia conista*
C. fimbriata
C. furcata
C. pityrea
C. pyxidata
C. rangiformis
**Cladonia squamosa* var. *allosquamosa*
C. subulata
Lecidea granulosa
Peltigera canina
P. polydactyla
P. rufescens

The greatest development of lichens occurs in areas with mostly the granular type of slag, which are presumed to be the older slag heaps. On the vitrified, newer, slag heaps lichen development is least and is mainly limited to *Cladonia furcata*, *C. rangiformis* and species of *Peltigera*. An inverse relationship between higher plant and lichen growth appears to exist in all of these sites. On the newer slag heaps higher plant growth is now dominant where sufficient soil has developed. On the older slag heaps higher plant growth is extensive but large lichen patches also exist, rich in species and numbers. An almost pure carpet of lichens interspersed with mosses and sparse grass may develop. It is possible that these patches are amongst the richest in lead and zinc.

The species present on both the lead slag and the soil on slag heaps are strikingly similar to those recorded by Lambinon *et al.* (1964) from old zinc mines in Belgium. Common to all of these sites was *Stereocaulon nanodes* which was usually equated with the form *tyroliense*. This form, proposed in Maquinay *et al.* (1961), is one "in which true podetia are mostly absent, and the thallus consists of flattened-bifacial squamules directly sessile on the rock". Material with this morphology has been found at Charterhouse but probably only corresponds to a condition of the thallus due to reduced humidity and increased abrasion on the exposed surface of the slag. *Stereocaulon pileatum* is more common than *S. nanodes* at Charterhouse. Lambinon *et al.* (1964) also recorded *Stereocaulon nanodes* f. *nanodes* and *S. dactylophyllum* but, surprisingly, not *S. pileatum.* On the soil *Cladonia subulata* (*cornutoradiata*) was also frequently recorded and they suggested that highest zinc levels in this species were associated with deformed podetia. Similar deformations occur at Charterhouse but there was insufficient material to test their hypothesis.

LEAD AND ZINC IN LICHENS

Table I

Lead and Zinc Content of Lichens and Soils (in ppm)

	Lead			*Zinc*			
	Charterhouse	Soil sample	Dunkerton	Charterhouse	Soil sample	Dunkerton	
			Lichens				
Peltigera polydactyla	970	A	N.D.	330	A	N.D.	
Cladonia furcata	710	A	N.D.	234	A	N.D.	
C. rangiformis	1220	A	N.D.	240	A	N.D.	
C. fimbriata	290	A	N.D.	243	A	N.D.	
C. subulata	1310	B	N.D.	298	B	N.D.	
Ceratodon purpureus	4340	B	—	960	B.	—	
Stereocaulon pileatum	4610	Slag	(545)*	816	Slag	(640)*	
			Soil under lichens				pH
Charterhouse:							
Soil sample A	4350		—	1800		—	5·2
Soil sample B	15000		—	4500		—	6·3
Dunkerton Soil sample	—		9	—		12	3·8
Slag analysis†	14000		—	51900		—	

N.D.—not detectable.
*Material collected from roadside walls Henleaze, Bristol (O.S. 31/585771).
†Analysis supplied by Kingston Minerals Ltd., Bath.

Table 1 shows the lead and zinc content of lichens and the soil underlying them collected from Charterhouse and, for a comparison with a lead and zinc poor area, acid colliery waste (pH 3·8) at Dunkerton (O.S. 31/699585). Dunkerton soil is virtually free of lead and zinc soluble in acetic acid, and this is reflected in the values of these metals in the lichens, being below the detection limit of the analytical method. The two soil analyses from Charterhouse show it to be rich in both lead and zinc and also shows the variation in amount of these metals between different soil samples. There is very little variation in the zinc content of soil-grown lichens but the lead content varies between species from 290–1310 ppm. These variations are probably due to differences in lead uptake capacity directly from the soil and not the atmosphere (by splash or in rain) as there is no apparent correlation between lichen morphology and their lead and zinc content. As the samples of lichen and soil were taken from a small area, variations in the lichen metal content due to soil differences have been minimised. Analysis for the moss *Ceratodon purpureus* have been included because it grows mixed with *Cladonia subulata* and hence reduces the possiblity of soil variation to a minimum. It is apparent that these two species have very different uptake capacities for lead and zinc.

It is probably fortuitous that the lead and zinc values for *Stereocaulon pileatum* from Charterhouse are similar to those of *Ceratodon purpureus*. The lead values for slag and soil under *Ceratodon* are similar but the zinc values are ten fold greater in the slag. It is unlikely, however, that either element is as available from the slag as from the soil. No attempt has been made to analyse the substratum (brick) on which the Henleaze *Stereocaulon pileatum* was growing. In addition to the brick possibly containing lead and zinc the following other sources may contribute 1) car exhaust fumes, 2) Avonmouth zinc smelting works and 3) Southmead Hospital. The small and sorediate nature of the podetia of this species makes it difficult to obtain samples completely free of non-digestable material. These particles may be a source of contamination for either metal but the reproducibility of results suggests that they are probably inert or metal free. The only other material growing on lead slag which can be conveniently removed and analysed is the moss *Grimmia doniana*. Contamination by rock and soil fragments is less of a problem with *Grimmia* than *Stereocaulon* and it has been shown (Brown & Bates, 1972) that at Charterhouse *G. doniana* contains 4735 ppm lead compared to a value of 650 ppm in material from the Brecon Beacons.

Comparison of the present results for zinc with those of Lambinon *et al.* (1964) show very little quantitative agreement. These authors used a total dry ashing and acid digestion method for soil and rock analyses. In the latter case their levels are about ten fold lower than quoted here. The value used here was kindly supplied by the Kingston Minerals Ltd., Bath, but the actual method of analysis is not known. Values for zinc in the soil are usually ten fold higher in the Belgian work but again this may depend on the method of soil extraction. Total digestion was used in both cases for the lichen analyses, although the technical details differ. Lambion *et al.* (1964) have higher values for *Cladonia subulata* (12x), *C. fimbriata* (3x), *C. rangiformis* (3x) but about the same for *C. furcata*. The Belgian values for *Stereocaulon nanodes* are higher (7x) than the present figure for *S. pileatum.* The reason for the discrepancy between these two pieces of work is unknown but suggests that some of the conclusions concerning uptake and concentration of zinc by lichens given by Lambinon *et al.* (1964) need further consideration

I am pleased to acknowledge the assistance of P. W. James with the determination of many of the lichens.

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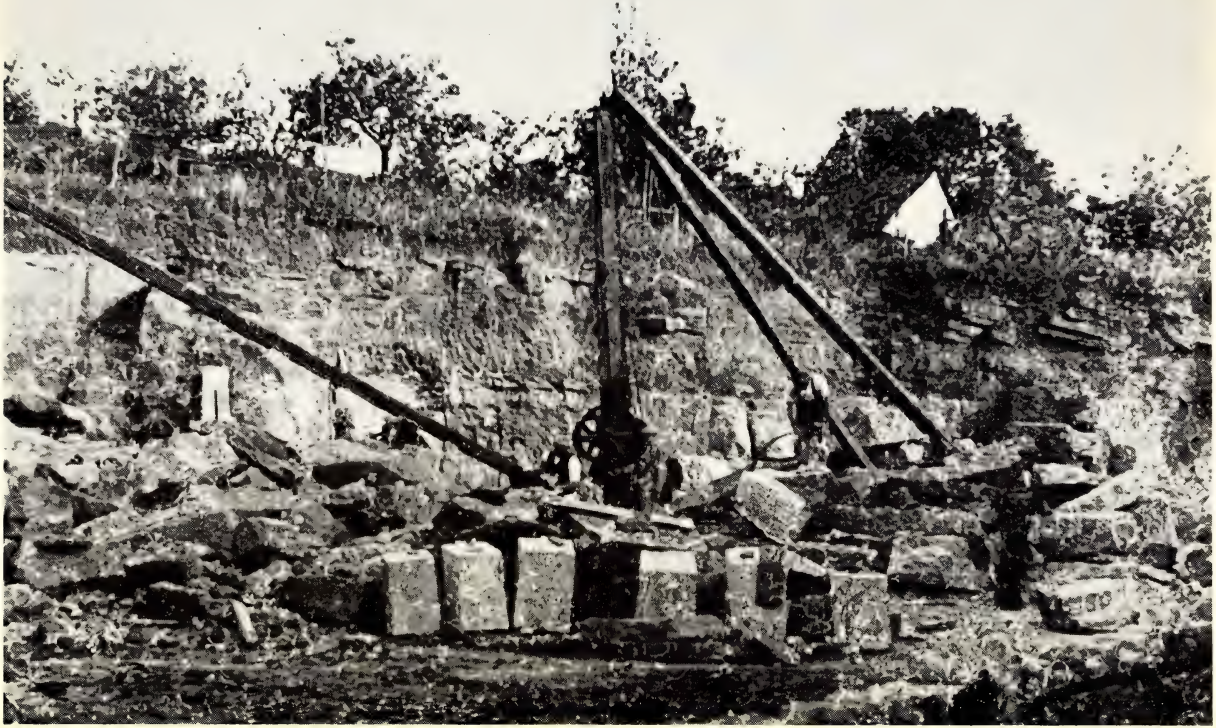

PLATE II

Bryscomb Quarry 1936-7

Photo: D. E. Mullins

DRAYCOTT STONE AND MARBLE, SOMERSET

By F. S. Wallis

BETWEEN Cheddar and Wells is a line of attractive villages, of rather similar general character, lying between the steep flank of Mendip to the north and the low-lying Somerset Moors to the south. Situated mainly between the 100 and 200 foot contours on a narrow ledge of Triassic Dolomitic Conglomerate, the villages owe their individual positions to springs of water issuing from that rock.

Although both the Draycott stone and marble are well-known in Somerset, and indeed further afield, nothing has been recorded of the history of this small industrial undertaking and the purpose of this paper is to collect such information as is available from "Oldest Inhabitants" and elsewhere before it is entirely lost.

At Draycott G.R. ST 478509 the Dolomitic Conglomerate is known as Draycott Stone and its attractive reddish tinge, described by John Strachey in 1727 as "surpassing foreign marble", and emphasised by polishing and moisture, no doubt attracted attention in very early times. In an area where greyish-blue Carboniferous Limestone and cream-coloured Doulting Stone are the dominant building materials, this reddish stone would naturally provide a contrast.

The stone is a reddish breccia or conglomerate chiefly composed of angular, sub-angular, and rounded fragments of Carboniferous Limestone, cemented by a fine-grained, iron-stained (haematite) limestone debris. The fragments vary considerably in size, but average that of a small walnut. The rock is the result of scree conditions in Triassic times.

In pre-quarrying times it is easy to visualise a line of prominent crags lying slightly to the east of the present main road in Draycott, its reddish tinge naturally attracting more notice than the yellowish-grey variety of Dolomitic Conglomerate seen further to the east at Westbury-sub-Mendip, Easton and elsewhere, where it is known as the Westclose Hill Conglomerate.

The main source of supply was Bryscomb quarry ST 47755108 and the following details as given by Green & Welch in 1965 are still clearly visible (Plate 11).

		feet
Marl and conglomerate debris		4
Massive conglomerate		$2\frac{3}{4}$
Marl		$4\frac{1}{4}$
Draycott Marble	Massive conglomerate	6
	Marl parting	$0–\frac{3}{4}$
	Massive conglomerate seen	$4\frac{1}{2}$

Draycott stone is a rather rough, tough rock, but large tabular masses, measuring approximately 8 x 3 feet and about 8–9 inches thick could easily be obtained. Probably one of the largest pieces of Draycott Stone ever obtained from the quarry is now a polished table top at Longleat which the Marquess of Bath informs me measures 9 feet 2 inches by 4 foot 1 inch.

According to Kelly's Directory, Bryscomb quarry was owned by William Star from 1860–97 and he sold it to P. Chapman who is reported as also making cider in the quarry sheds. Chapman lived at the Batch, Draycott and subsequently owned the Railway Hotel in the village.

About 1917 Mr. Gillian purchased the quarry from Chapman. He was an energetic business man and it was during the period of his ownership that the industry was at its maximum productivity and popularity.

The rock was quarried by drilling holes about 4–5 inches apart and to the depth of the bed. One man sitting down held and rotated a chisel, whilst another delivered heavy blows with a sledge hammer. Steel strips were then placed in the holes and by careful and selective wedging large flat slabs were levered away from the parent rock. The smaller slabs were then worked into large and small posts, supplied and installed at 5gs a pair, and other articles by hammer and chisel.

Stone for the marble trade was hoisted on to a truck by a manual-powered crane and brought to the shed at the eastern end of the present converted residences by a short piece of "deccaville" track, and placed on a platform. Here it was cut by saws driven by a petrol engine. Several saws, generally 4 or 5, operated at the same time, and were spaced according to the width of the finished article. Sand and water were used as lubricants. The initial polishing was done by a machine giving a back-and-fro motion using carborundum, whilst the final polishing was carried out by hand using putty powder. Owing to the texture of the stone, cavities appeared from time to time and these were filled in with a type of cement the nature of which has not been ascertained.

Gillian worked the quarry until 1925 and according to local information much of the marble he produced was used in the First World War memorials, especially in the Sussex area, and relatively large consignments left weekly by rail. In spite however of hard work and extensive publicity it was not a successful business venture and Gillian sold it to Eyles in late 1929 or early 1930. A photograph by Mr. D. E. Mullins shows the quarry in work in 1936–7, but it probably closed finally soon afterwards (Plate 11). Lack of success was probably due to poor transport facilities and the fact that the stone owing to its nature would not take as high a polish as others.

The sawing and polishing shed still stands at Bryscomb, but was skilfully converted about 1940 into four attractive residences. The quarry floor was levelled in 1955 to form a garden. Apart from the quarry which still has a good face, the only known relics of this industry are part of a wooden handle of a two-handled saw and a 28lbs weight in Wells Museum and two stones about 12 by 18 inches with iron bolts in the garden of the converted building. Messrs. S. Hann, George Stott and W. Major were among the last workers.

The stone was also quarried by George Watts about 200 yards S.E. of Bryscomb quarry (ST 47845093). This was chiefly worked in the latter part of the 19th century and closed when Watts died in 1917, at which date the workmen employed were transferred to Bryscomb quarry. No polishing was undertaken by Watts, but a large amount of dressed stone was supplied for various buildings, such as the Rodney Stoke Inn in 1890, the new part of Temple Meads on 1871–80 and elsewhere. He also supplied a large number of dressed stones for house and farm gate posts, etc.

Still further along the outcrop of the Draycott stone towards the S.E. was Lukin's quarry ST 48015066. This, as well as Watts quarry is clearly traceable at the present time, but nothing can be ascertained of its history except that it was worked spasmodically in the latter part of the 19th century.

Although the stone probably attracted the attention of Prehistoric folk, the first authentic use of the stone was in late Saxon times in buildings excavated by Philip Rahtz in the grounds of Cheddar Vicarage (1966). In a letter of April 29th 1972 Mr. Rahtz states that it is possible that the stone was used in the immediate post-Roman period but that this has not been confirmed. Mr. Rahtz also informs me (in letter May 15th 1972) that Draycott stone was found at Beckery Chapel, Glastonbury (in press 1973) in the context of a ditch of mid-late Saxon date. It was not associated with any known buildings on the site and other buildings of this date were of timber construction.

At the Cheddar Palace excavations Mr. Rahtz (1964) found that the stone was not used in the foundations of the 10th and 11th century chapels and not in any Palace context earlier than the wall footings of King John's aisled hall dated on archaeological and historical evidence to 1209–11.

The date of four polished pillars of Draycott Marble at the western end of the nave of Wells Cathedral is a problem with conflicting evidence. They contrast strongly with the surrounding Doulting Stone and Dr. R. D. Reid kindly drew my attention to *The Tourists' Guide to Wells*, probably published in the 1880's, where on p.50 it is stated that "the four fine columns of Draycott Conglomerate add to the richness of the West end and contrast well with the Blue Lias shafts. The one nearest the S.W. doorway is modern, the gift of the late Canon Meade, at whose expense the original columns were restored". Then Mr. J. I. Irvine writing in 1874 states that Canon Meade lately restored three columns of Draycott Marble the polish of which had been dimmed by 700 years. He also mentions that the pillar of white stone in the S.W. was replaced by Draycott Marble in the spring of 1874 at the expense of Canon Brown, Archdeacon of Bath. But in 1824 Buckland & Conybeare refer to these shafts and incidentally use the term "wonder stone" for the Draycott stone. It would appear that it is possible that at least three of the pillars date back to the extensive restoration work of 1660 or even to the original building of the West Front in the 13th century and that the pillar in the S.W. may be of 19th century date. It is significant that the pillar in the S.W. has a diameter of approximately 7 inches whereas the other three pillars are approximately 6 inches in diameter. Some confirmation of a 1239 date for three of the pillars is given by the extensive use of coloured stones by the late early English builders in order to give a contrast with the surrounding material.

Partial confirmation of the 17th century date is in the four tombstones of semi-polished Draycott Marble to be seen on the floor of Wells Cathedral and dated 1644, 1651, 1652 and 1655, and one illegible. There is also a semi-polished memorial stone of Draycott Marble in Wedmore Parish Church dated 1583 which confirms that Draycott stone was quarried, cut and at least partially polished in the late 16th century. It perhaps can be stated here that of the two tombstones in Wedmore Church mentioned by B. D. Webby only one remains and the mantelpiece in the nearby Mansion House has disappeared. Unfortunately, nothing is then known about the use of the stone until the late 18th century. After which date it was used extensively and locally throughout the 19th century especially in the mid 1800's and up to about 1940.

The nave pillars at Ashwick Church are of Draycott Marble and are dated 1877–80, as are the pillars at Ammerdown, the seat of

Lord Hylton, which were erected in 1860. The Chancel and aisle of Loxton Church were paved with Draycott Marble in 1913. Throughout the so-called Cheddar Valley the stone, polished, semi-polished or only dressed may be seen in almost every village as gate-posts, both in farms and dwelling houses, tethering posts, sinks, lintels, mantelpieces, pump troughs, steps, railway buildings, altars and chancel steps, and weights. Gateposts are of two sizes. Generally on farms they are about 6 feet above the ground and measure approximately 15 inches wide and 9 inches thick with a plain semi-circular top. Those used for dwelling houses are smaller showing about 4½ feet above the ground, with a width of about 13 inches and 6 inches thick. They either have a semi-circular top often combined with a lateral semi-circular notch to give the effect of a finial. Both these types of gateposts were undoubtedly made to standard sizes at the quarry for they may now be seen in many parts of the district. A dated example (1896) may be seen in the gateposts at Easton School, now Easton Social Club. The main market for the stone was undoubtedly the City of Wells, especially in the latter half of the 19th century and so numerous are its occurrences that only a few typical ones can be mentioned.

An outsize gatepost is outside the Rose & Crown in St. John's Street, whereas at Nos. 13 and 15 Priory Road are examples of gateposts of the smaller dwelling house type. The stone is also seen in the quoins of the houses contrasting strongly with the Carboniferous Limestone used in the main walls, whereas at Nos. 17 and 19 Priory Road the houses are built of Draycott stone with Bath stone quoins for contrast. The facades of 1,3, 5, 9 and 11 Portway are built of Draycott stone and it can also be seen in Ethel Street, and Davis Terrace in Tucker Street built about 1896, where the, rusticated type of stone is used.

Interesting examples, probably middle 18th century, are in the plinth of the railings in front of 17 Chamberlain Street and in Southover Street, where it can be seen on the pavement and on the steps at the end of the passage between numbers 3 and 5. In the Market Place, Wells, it occurs at the base of the central lamp post and in Union Street it forms some of the fenders used to protect buildings from cart wheels. The station buildings in Tucker Street are built of Draycott stone and it is of interest that the nearby bridge of the railway is of the greyish-yellow type of Dolomitic Conglomerate. This rather indicates that whilst the Great Western Railway favoured the use of Draycott stone for buildings, the County Council and local authorities used the greyish-yellow variety.

During the course of this investigation the Dolomitic Conglomerate at Wookey Hole was compared with the Draycott stone. The former is definitely less reddish, i.e. less haematite,and also in at least two old quarries on the hillside north of Wookey Hole (ST 533479 and 533482) occurs in large and small lumps and not in a tabular form as at Draycott. The stone used in many houses and other buildings chiefly late 19th and early 20th centuries, in Wookey Hole was of the local type which was not used, at least to any great extent, in Wells.

It seems evident that Draycott supplied the large slabs seen in the Cathedral and Wedmore in the 16th and 17th centuries and that the trade once established in the village continued until about 1940 in spite of developments at Wookey Hole.

I am deeply indebted to many who have interested themselves in this regional study and have drawn my attention to specific examples, particularly the Marquess of Bath, Mr. Robin Atthill, Mr. L. S. Colchester, Mr. I. P. Collis, Mr. E. Crabb, Mr. Luke Devenish, Mr. F. G. Dimes, The Rev. T. Heaton, Mr. D. E. Mullins, Mrs. Frances Neale, Dr. George Parker (also for a valuable series of photographs), Mr. P. Rahtz, Mr. D. M. M. Shorrocks, Dr. R. D. Reid, Mrs J. Walker and Mr. W. A. Wheeler.

Local inhabitants in Draycott have been particularly helpful and have willingly submitted to questioning and here one would especially mention Mrs. M. Burgess, Mrs. C. M. George and Mr. W. J. Miles. To all these, and to those not specifically named, I would extend my grateful thanks.

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A PRELIMINARY SURVEY OF THE LITTORAL FAUNA AT FOUR SITES ON THE SOUTHERN SHORE OF THE BRISTOL CHANNEL AND SEVERN ESTUARY

By M. P. Hill-Cottingham

Introduction

A series of studies on the Biology of the Bristol Channel was published in this journal between 1937 and 1940 culminating in a paper by R. Bassindale summarising all the fauna records since 1853 and including his own survey of 1940.

In order to determine whether there had been any significant changes over the last thirty years, a group of Sixth Form Biology students from Backwell Comprehensive School and St. Brandon's School, Clevedon, under the direction of the author and Miss P. Hill visited sites at Kilve, Brean Down, Clevedon and Aust between April 14–19, 1972 to record species and make population studies.

At each site a transect was made from H. W. M. to E. L. W. S. and a further hour was spent in general collecting. Gammaridae and Polyzoa and some Annelida remain to be identified.

Sites Visited

KILVE

The transect (G.R. 146 447) was taken approximately 150 yards (135 metres) east of where the fresh-water stream runs on to the beach. General collecting was also done in the neighbourhood of the stream run off and to the west.

BREAN DOWN

Three transects were taken; at the landward end of the peninsula on the south side (G.R. 287 588), the northern end of the peninsula (G.R. 287 595), and about half way along the northern side (G.R. 288 593).

CLEVEDON

One transect was taken from the salt pans at H.W.M. to E.L.W.S. at Blackstone Rocks (G.R. 385 704).

AUST

Three short transects were taken, one at H.W.M., one at M.T.L. and one at E.L.W.S. (G.R. 565 899).

Results

The species identified and some estimates of the numbers present in April 1972 are listed in Table 1 alongside the 1940 records for corresponding sites taken from Bassindale (1940). We did not survey at Blue Anchor and substituted Clevedon for Portishead. However, the time spent at each site was roughly comparable with that of the earlier survey.

The results of 1972 show that the overall picture has not changed very noticeably, there are some new records although other species appear to be absent.

Table 2 summarises the results by listing the number of species in each phylum found at four comparable sites in 1940 and 1972. Although there is a general reduction, it is not uniform between phyla. The mollusc records are very similar but the arthropod records have approximately halved. The table also indicates changes at each site; the most obvious being the reduction of records at Aust.

At Aust, the growth of fucoids especially *Fucus vesiculosus* and *Ascophyllum nodosum* was dense and luxuriant. There was no sign of grazing. No living *Patella vulgata* or *Littorina saxatilis* was found and only six living specimens of *L. littoralis* and one of *L. littorea* was found in about three hours of searching. In one gully of approximately $3m^2$ capacity empty shells of *L. saxatilis* and *L. littoralis* were found to a depth of 10cm. It is estimated that of the total of approximately 55,000 shells, the proportion of *L. littoralis* to *L. saxatilis* was 10:1. The size of the shells of both species indicated that they were adult shells and the area may, by its topography, simply have acted as an area of deposition.

The most interesting new record is that of *Elminius modestus* Darwin, an Australian species first noted in Britain on the south coast in 1945 (Bassindale 1964). As this species was recorded at all four sites it is obviously well established in the Bristol Channel and in many areas it is now the most common species of barnacle.

Acknowledgements

The author is grateful to Dr. C. Little of the Zoology Department, Bristol University for his help and encouragement, to Miss P. Hill of St. Brandon's School, Clevedon for her assistance both in the field and in the laboratory and to Mr. R. Bassindale for helpful discussion in the preparation of this paper.

TABLE I

COMPARISON OF LITTORAL FAUNA IN THE BRISTOL CHANNEL BETWEEN 1940 AND 1972

Species	Blue Anchor	Kilve		Weston		Clevedon	Portishead	Aust	
	1940	1940	1972	1940	1972	1972	1940	1940	1972
Clava multicornis	+							+	
Turris neglecta	+c								
Tubularia indivisa	+c	+c	+	+a	+		+	+a	
Halecium halecinum		+							
Campanularia exigua		+							
Clytia johnstoni		+		+					
Obelia dichotoma			+		+	+			
Laomedia gelatinosa	+c			+a				+	
Dynamena pumila		+r			+	+			
Sertularia cupressina		+c					+c	+c	
Actinia equina	+fc	+	+	+	+	+c			
Tealia felina	+c	+c	+	+c		+	+c	+r	
Sagartia troglodytes	+					+			
Pleurobrachia pileus						+			
Procerodes ulvae		+a	+						
Leptoplana tremellaris	+f								
Lineus gesserensis	+r	+r		+r		+?sp	+r	+r	
Lepidonotus squamatus	+	+	+	+			+		
Harmothoe imbricata	+c	+c	+?sp	+c					
Nereis pelagica	+c	+c		+c	+	} +?sp		+	
Nereis diversicola	+r	+			+				
Platynereis dumerili				+fc		+			
Nephthys hombergi	+r	+c				} +?sp			} +?sp
Nephthys cirrosa	+c								
Marphysa sanguinea	+r								
Lumbriconereis latreilli	+f	+	+						
Nerine cirratulus	+a								
Pygospio elegans				+					
Polydora ciliata	+a	+							
Arenicola marina	+a			+a	+c				
Sabellaria alveolata	+r	+a	+	+a	+	+a			
Amphitrite johnstoni					+		+		
Hydroides norwegica	+f			+				+	
Pomatoceros triqueter				+r		+r			
Clitellio arenarius			+		+				
Phascolosoma elongatum	+r								
Balanus balanoides	+fc	+fc	+	+	+				
Balanus improvisus	+d	+	+	+	+	+	+	+	
Elminius modestus			+c		+c	+c			+
Cyathura carinata	+f	+							
Eurydice pulchra		+r		+c			+r		
Sphaeroma serratum		+	+		+		+c	+c	
Sphaeroma rugigcauda							+f		
Idotea granulosa			+	+	+	+	+	+	+
Idotea viridis								+r	
Janira maculosa	+c	+c		+					
Jaera albifrons	+c	+c		+c			+c	+c	
Ligia oceanica	+	+		+		+r	+	+	
Ampelisca sp.	+r								
Bathyporeia pelagica	+r								
Bathyporeia elegans		+r							
Haustorius arenarius	+r								
Callipius crenulatus		+f		+a			+a		
Calliopius laeviusculus				+f					
Neopleustes bicuspis		+r							
Gammarus spp.	+	+	+	+	+	+	+	+	+
Talitrus saltator		+r							
Orchestia mediterranea							+r		
Orchestia gammarella	+	+					+a	+a	
Talorchestia deshayesei								+a	
Hyale nilssoni	+			+r				+r	
Amphithoe rubricata		+r							
Corophium volutator		+r			+r			+r	
Eupagurus bernhardus	+c	+r	+	+f	+r				
Carcinus maenas	+c	+c	+c	+c	+c	+	+c	+	+
Cancer pagurus	+	+		+					
Pycnogonum littorale	+r								
Lepidochitona cinereus	+	+	+	+fc	+	+c	+	+r	
Patella vulgata	+c	+c	+c	+c	+c	+	+c		
Littorina littorea	+c	+c	+c	+fc	+	+			+r
Littorina saxatilis	+c	+c	+c	+c	+c	+	+c	+c	+d
Littorina littoralis	+c		+c	+fc	+	+	+r	+fc	+

Species	Blue Anchor	Kilve		Weston		Clevedon	Portishead	Aust	
	1940	1940	1972	1940	1972	1972	1940	1940	1972
Nucella lapillus	+a	+a	+a	+a	+a	+c			
Ocenebra erinacea	+r								
Buccinum undatum	+d		+d	+c					
Acanthodoris pilosa	+r	+r							
Onchidoris muricata	+f	+r		+c					
Aeolidia papillosa	+r				+r				
Nucula nucleus	+c								
Anomia ephippium	+f								
Mytilus edulis	+c	+	+		+r	+r	+	+	
Musculus discors		+r							
Macoma balthica	+c	+c	+d	+c				+a	
Pholas dactylus	+d	+d	+d						
Barnea candida	+d	+d	+d						
Barnae parva	+d	+r	+d						
Polyzoa spp.	+	+	+	+	+	+	+	+	
Amphipholis squamata	+r		+r						

KEY: + = occurrence(s) r = rare f = few fc = fairly common
c = common a = abundant d = dead

TABLE 2

COMPARISON OF 1940 AND 1972 RECORDS EXPRESSED AS NUMBER OF SPECIES PER PHYLUM

	1940					1972				
	Kilve	Weston	Portishead	Aust	Total records	Kilve	Weston	Clevedon	Aust	Total Records
Coelenterata	8	5	3	5	21	4	4	5	0	13
Ctenophora	0	0	0	0	0	0	0	1	0	1
Platyhelminthes	1	0	0	0	1	1	0	0	0	1
Nemertini	1	1	1	1	4	0	0	1	0	1
Annelida	8	9	2	2	21	4	6	5	1	16
Arthropoda	19	14	12	12	57	8	9	6	4	27
Mollusca	13	9	5	5	32	12	8	7	3	30
Echinodermata	0	0	0	0	0	1	0	0	0	1
Total no. species	50	38	23	25	136	30	27	25	8	90

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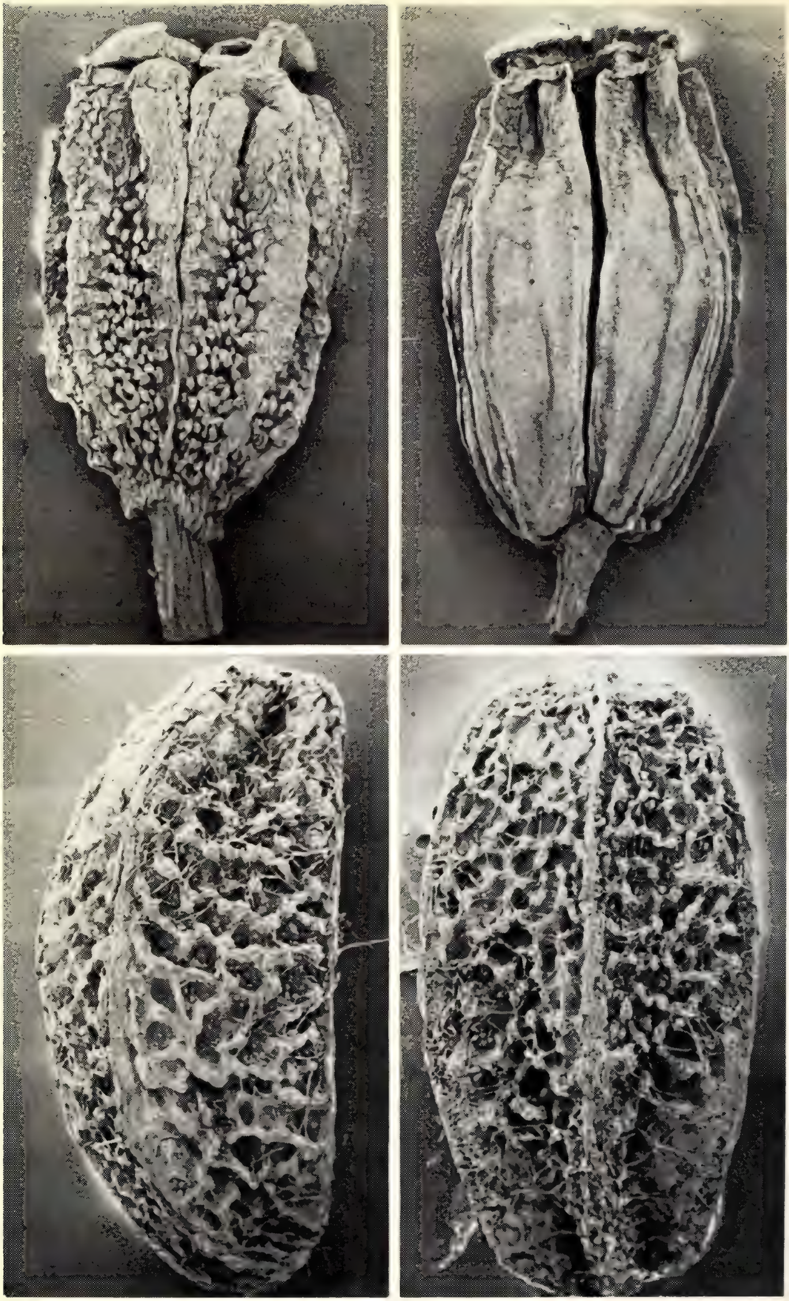

PLATE III

Above —Unripe fruits of *Bupleurum* spp., *ex* Armitage Herbarium.
left: *B. lancifolium*, Dorset, August 1887.
right: *B. rotundifolium*, Beds., July 1896.

Below —Ripe 'seeds' (mericarps) of *B. lancifolium*, Abbots Leigh, 1971.
left: lateral view.
right: dorsal view. (All x 18)

BUPLEURUM LANCIFOLIUM HORNEM. AND *B. ROTUNDIFOLIUM* L. (*UMBELLIFERAE*) IN BRISTOL AND ELSEWHERE

By T. E. T. Bond

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Bupleurum lancifolium Hornem. (*B. protractum* Hoffmanns. & Link) (*B. subovatum* auct.) and *B. rotundifolium* L. are annual Umbelliferous herbs of distinctive appearance, very unlike other members of the family. Both are rare; and the two species have frequently been confused with one another. The recent occurrence of *B. lancifolium* in our area (*Bristol Botany in 1971*, and see below) has indicated the desirability of drawing attention to the characters by which they may be distinguished. The opportunity is also taken of comparing these two species in respect of the previous records of their occurrence in the neighbourhood of Bristol and of their present status in the British flora generally.

Material Studied

The plants of *B. lancifolium* which were the original object of this communication were checked against specimens from collections incorporated in the University of Bristol Herbarium, as follows:—

B. lancifolium—J. W. White Herbarium (as *B. protractum* Lk.); Eleonora Armitage Herbarium (as *B. rotundifolium* L.).

B. rotundifolium—J. W. White, C. Bucknall, David Fry and Eleonora Armitage Herbaria.

The Species Distinguished

Both are erect, somewhat glaucous annuals with simple entire leaves of which all but the lowermost are perfoliate. They have small yellowish flowers, shortly stalked in clusters (umbels) surrounded by conspicuous leafy bracteoles. The flower clusters are borne on stalks (primary umbel rays) of rather unequal length. Since these are relatively few in number and are not themselves subtended by bracts (*i.e.* the primary bracts are lacking), the umbellate nature of the inflorescence may not be immediately apparent. In fact, as Hutchinson (1955) has already indicated for *B. rotundifolium*, there is a superficial resemblance in both inflorescence and vegetative characters to a species of *Euphorbia;* and it is only on examining the individual flowers that either species is revealed as typically a member of the *Umbelliferae.*

The principal distinguishing characters of the two species, according to Tutin (1968), are given in the accompanying Table:—

DISTINGUISHING CHARACTERS OF *BUPLEURUM ROTUNDIFOLIUM* AND *B. LANCIFOLIUM*

	Leaves	Umbel rays	Bracteoles	Fruit
B. rotundifolium	elliptic-ovate to suborbicular	(3–)5–10	oblanceolate to ovate or obovate, acuminate . . . veins conspicuous	3–3.25 mm, elliptic-oblong, smooth; ridges filiform
B. lancifolium	usually ovate- or oblong-lanceolate	2–3(–5)	suborbicular, mucronate	3–5 mm, ovoid-globose, conspicuously tuberculate

The differences may be summarised by the statement that *B. lancifolium* has narrower leaves, fewer primary umbel rays and broader bracteoles than *B. rotundifolium;* and larger, broader, distinctively roughened or tuberculate fruits. It should be noted that the difference in leaf shape is not so obvious as might appear from the respective specific epithets: both leaf shape and the number of umbel rays may show some overlap between the two species, as may the size and shape of the fruit. The shape of the bracteoles is fairly distinctive and a further difference is that the veins are much less conspicuous in the, broader, bracteoles of *B. lancifolium* than they are in those of *B. rotundifolium.* The most characteristic difference between the two species however is in the surface appearance of the fruits—smooth and with filiform ridges in *B. rotundifolium,* conspicuously roughened and with obtuse ridges in *B. lancifolium.* This difference, which with a good lens can be detected very shortly after flowering, is illustrated by the 'Stereoscan' micrographs, Plate 111.

Occurrence in Bristol

Local records as given by White (1912) and confirmed by the examination of herbarium specimens as noted above indicate that whereas both species have been found on rubbish tips and other waste places in and around Bristol in the past, *B. rotundifolium* alone had occurred also as a localised but fairly persistent weed of arable land. More recent information has been sought from Sandwith's (1933) '*Adventive flora of the port of Bristol*' and from the '*Bristol Botany*' reports published annually in these *Proceedings*. From these it may be inferred that *B. rotundifolium* is now virtually extinct in our area, having been noted only once in the last fifty years, as a garden weed. *B. lancifolium*, with a similar record of virtual disappearance from the vicinity of Bristol in the 1920's onwards, was reported from Winterbourne in 1962 and, again as a garden weed, from Tormarton in 1966. Now it has appeared on the Somerset side of Bristol, having been brought to my attention from Abbots Leigh in 1971 and from Long Ashton in 1972—in both instances as a solitary specimen on a garden site where imported bird seed had been used to feed wild birds during the winter (personal communication).

Status in the British Flora Generally

According to *Flora Europaea* (Tutin, 1968), neither species is native in Britain; *B. lancifolium* being exclusively Mediterranean in its natural distribution, with *B. rotundifolium* widespread throughout Central and Southern Europe. *B. rotundifolium*, as is well known, however, has a long history in Britain, at least as far back as the time when William Turner (1548) suggested that this 'herbe wyth . . . litle blacke seedes in the top . . . maye be called in englishe Thorowwax, because the stalke waxeth thorowe the leaues'. William Turner found the plant 'growing in great plentye' (White, 1912) near Somerton in Somerset where it was still 'in some years abundant' according to the county flora published more than 300 years later (Murray, 1896). During this interval it had become known generally as a widespread if somewhat erratic weed of corn fields and waste places especially on calcareous soils, extending from the southern and eastern counties of England to as far north as the south of Scotland.

The current status of the two species in Britain may be summarised from the distribution map (for *B. rotundifolium*) in the *Atlas of the British Flora* (Perring and Walters, 1962), from the various county floras published subsequently and from the earlier but still recent floras of our two neighbouring counties of Gloucestershire (Riddelsdell *et al.*, 1948) and Wiltshire (Grose, 1957). The *Atlas* map indicates that, out of a total of some 230 10 km² records of *B. rotundifolium*, about 70 (30%) refer to occurrences as a casual; furthermore, of the remainder, only 18 (11%) belong to the period of 1930 onwards. The possibility of confusion with *B. subovatum* Link (=*B. lancifolium*) is also noted. The county floras (seventeen in all) indicate that *B. rotundifolium* is currently regarded as a rare, decreasing or extinct arable weed in eight counties and occurs as a casual (adventive) in waste places etc. in seven; *B. lancifolium* is recorded as a casual in twelve counties, in nine of them in some degree of association with bird seed. In four county floras, *B. lancifolium* is said to be often reported as *B. rotundifolium*. The whole survey confirms to a marked degree the impressions gained from the study of these species in the Bristol area.

To conclude, it may be worth re-defining two of the principal terms which have been used to define the status of these two *Bupleurum* spp. in Britain, *i.e.* 'colonists' and 'casuals'. *Colonists* are doubtful natives, with a long history in Britain but found only in habitats 'created and maintained by human activities' (Lousley, 1953). It follows that they are mainly weeds of cultivation. *Casuals* (adventives), on the other hand, are introduced species which are 'uncertain in place or persistence' (*l.c.*). That is not to say that they may not eventually become *established* (in man-made habitats) or even *naturalised* (in natural or semi-natural habitats); but, for the present, they are to be regarded merely as 'fugitive visitors' (White, 1912). Changes in agricultural practice or other human activities may result in the extinction of a formerly widespread colonist: its occasional re-appearance as a casual would then be the result of successive re-introductions from outside the area concerned. *B. rotundifolium* would appear to be an example of this in the Bristol area and in many of its former localities in the southern and eastern counties of England, where Salisbury (1953) has suggested that its decline as an arable weed may possibly be attributable to the improved screening of agricultural seeds. *B. lancifolium*, on the other hand, has never been other than a casual in Britain; on account of its roughened 'seeds' it would appear better adapted for dispersal than *B. rotundifolium* and its recent apparent increase as a 'bird seed alien' may perhaps be not unrelated to this feature. In any case, the practice of feeding wild birds with imported bird seed is likely to become a permanent feature of suburban life in Britain and it will therefore be of interest to observe whether either species may yet become established (or re-established) in our flora in consequence. The need for carefully distinguishing between them (preferably on their fruit or 'seed' characters), or for the preservation of voucher specimens, has been amply demonstrated by this study.

Summary

Two recent occurrences of *Bupleurum lancifolium* Hornem. (*Umbelliferae*) near Bristol are noted and previous local collections of this species and of *B. rotundifolium* L. examined. The distinguishing characters of the two species are reviewed with particular reference to their fruits and 'seeds', of which a 'Stereoscan' micrograph is provided. Their status in Britain has been estimated from a survey of county floras published since 1962. It is suggested that *B. rotundifolium*, previously a colonist of localised distribution as an arable weed, has now largely been reduced to the status of a casual; and that *B. lancifolium*, a typical casual, may now possibly be on the increase following the increased use of imported bird seed to feed wild birds. The need for care in distinguishing the two species in the records is emphasised.

Acknowledgements

I thank the Curator of the University Herbarium for permission to consult the collections there, and Dr. L. C. Frost for assistance with the literature.

Special thanks are due to Mrs. Elizabeth Parsons of Long Ashton Research Station for taking the 'Stereoscan' micrographs and for assembling the Plate.

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THE DEVELOPMENT OF THE "FLAP" TRAP FOR LIVE-CATCHING SMALL MAMMALS

By A. F. Jayne

DURING a weekend course on "The Study of Mammals", run by Birmingham University in December 1962, the need for a low-cost trap for the live-catching of small mammals was identified. The most readily available and hence widely used trap at that time was the "Longworth" (Chitty and Kempson, 1949) a successful and well proven design, albeit of comparatively high cost. The large numbers of traps frequently required in research work, together with possible losses in the field, could well be a limiting factor in a research programme of an unsponsored individual or small group working to a limited budget.

A trap, designed as a home-made alternative and based on the use of an 8″ x 6″ x 2½″ standard "OXO" tin, was displayed and discussed, then materials and facilities were made available for course members to construct a similar item. The proposed design however did not appear to be particularly practical, too much reliance being placed on a light, spring-actuated mechanism which was difficult to set. There were some doubts as to whether the mechanism would be proof against the rough handling inevitable during field work and that the effects of weather elements could cause malfunctioning.

A redesigned trap, based on a small version of the German Box type of weasel trap mechanism fitted into an "OXO" tin, was produced by the author and D. J. Hughes overnight. The mechanism was based on a see-saw balance principle eliminating any form of spring device. Two more of these traps were later constructed and field tested with encouraging catching results. A serious disadvantage however was found in the removal of captive animals, which either leapt out of the tin on removal of the lid or got into inextricable situations underneath the see-saw. Further experimental work on this design became impracticable due to the sudden disappearance of the "OXO" tin as an everyday article.

Other ideas were investigated and mostly discarded for various reasons. However the discussions highlighted the belief that whatever form of mechanism was designed the body of the trap should be based on some readily available throw-away type of container in order to facilitate manufacture and minimise the cost. Thus a small mechanism, with a minimum number of parts, which could be fitted to a variety of containers appeared to be an ideal requirement. A possible solution arrived at by D. J. Hughes established the principle which became the basis of the "Flap" trap.

The idea was to provide a swinging flap which an animal could push into the trap chamber but once inside would be unable to push back through. It was also thought necessary to prevent any animal inside from lifting the flap. The first two requirements did not appear to be difficult to resolve—the principles being widely used on commercial "cat-flaps"—i.e. flaps fitted into apertures cut in standard household doors to give cats access in and out without the necessity of opening the door. The third requirement, viz:—to prevent the flap from being lifted from the inside, did not have such a ready solution. An assumption was made that an animal pulling the flap towards itself by inserting a foot (or part of foot) under the bottom edge would release its hold on feeling the foot being squeezed. Thus if the lower edge of the flap, in pivoting about its hinge point, could be made to travel as close as possible to a flat base plate the gap would diminish to a minimum at the point of tangency (See Figure 2).

In order to achieve consistent functioning and to eliminate any variables which could adversely affect the consistency it is necessary to control the relationship of the bottom edge of the flap relative to the base plate, through a common feature, the hinge. Thus a single bracket was deemed necessary to ensure a constant relationship. This bracket must also be attachable to the chamber, hence the side lugs. It is of course essential that the side edges of the flaps have a minimum clearance of the sides of the bracket to ensure that a trapped animal is unable to insert a foot or digit to lift up the flap.

In the search for a chamber compartment an appraisal of the regularly discarded domestic containers quickly eliminated the majority as unsuitable. The plastic ones were considered to be vulnerable to the chewing of entrapped rodents, whilst the apertures of the bottles were too small to accommodate the mechanism. The screw-cap type of jar, such as those used for coffee or pickles, had obvious possibilities. The cap was large enough to accept a mechanism and it was a straightforward operation to cut an entrance hole in the thin gauge metal using a sharp, pointed cutting tool. The lid was quickly detachable, thus facilitating use in the field, yet very secure when in position on the jar. This container filled all the known requirements. It can be seen from Figure 1 that only three component parts, all of relatively straightforward construction, are required in the making of a "Flap" trap.

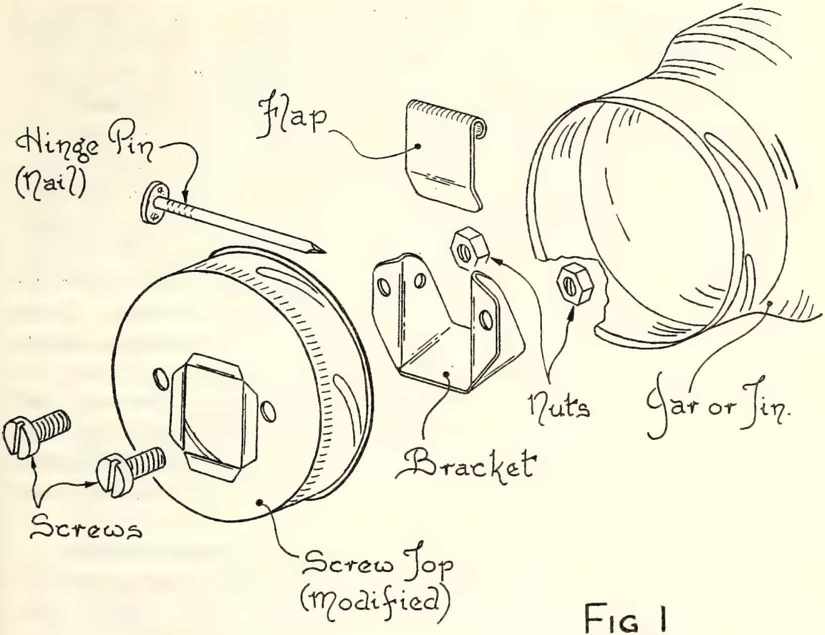
Flap
Hinge Pin
(Nail)
Screws
Screw Top
(Modified)
Bracket
Nuts
Jar or Tin.

FIG 1

COMPONENTS OF TRAP.

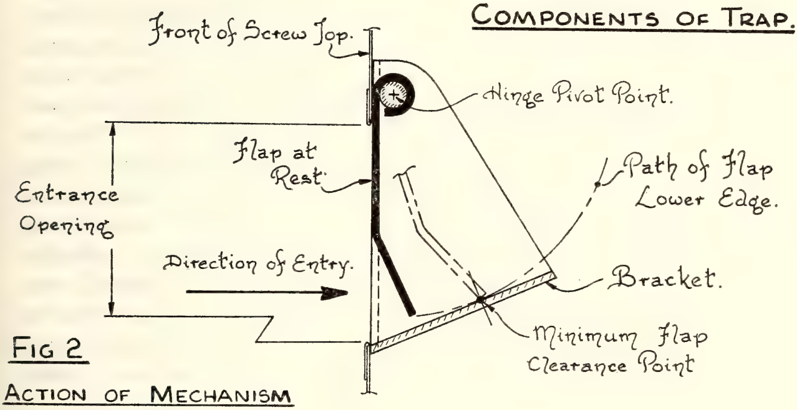
Front of Screw Top.
Hinge Pivot Point.
Flap at
Rest.
Path of Flap
Lower Edge.
Entrance
Opening
Direction of Entry.
Bracket.
Minimum Flap
Clearance Point

FIG 2

ACTION OF MECHANISM

Some field trials were held, using two prototype traps, in the autumn of 1963 with some moderate success—sufficient, it was felt, to indicate that the theory of the design was sound. They were used rather as a casual interest at this time as no real need to capture small mammals existed for the experimenters (A.F.J. & D.J.H.). However in January 1964, the author was faced with the need for feeding an injured kestrel, which had stubbornly refused all food until offered a live vole taken from the family cat, it becoming obvious that live food was all that would entice the bird to eat. The "OXO" traps and prototype "Flaps" were hurriedly resurrected and put to use in the field. The "OXO" 's caught occasionally but the Flaps did not. Following a careful re-appraisal of the latter the conclusions reached were that the mechanisms had not been made with sufficient accuracy and that the material used was too thin, enabling it to be distorted by a captive to such an extent as to make it ineffective. Five new traps were constructed using 20 S.W.G. (·036″ thick) light alloy material, especial care being taken over the accuracy to provide, where necessary, minimum clearances. These traps were laid and left down continuously for eight days and nights being visited at approximately 6.30am and 11.00pm each day. An average daily catch was made by these five traps of seven small mammals, mostly woodmice and bank voles. Three per day were kept for the kestrel and the rest released. On the release of the kestrel the traps were put back into storage, but the results obtained had given much encouragement.

In 1965 an informal mammal group was started within the Bristol Naturalists' Society, later to become officially sanctioned by Council as the Mammal Section of the Society (Feb. 1966). The first informal meetings held discussed the participation in the National Mammal Survey organised by the Mammal Society. It was quickly recognised that to attempt a survey of the small mammals organised trapping would be essential. A further seven traps were made by the author, which together with twelve borrowed Longworths brought the complement up to two dozen. The first official meeting of the Section was a practical workshop evening spent in one of the Bristol University's laboratories constructing "Flap" traps. It cannot however be claimed that the results of the evening's industry subsequently produced any noticeable contributions towards our knowledge of small mammals in the Bristol area. The first meeting during which traps were used soon followed on the evening of June 8 during which three species of mammal were caught (woodmouse, bank vole and common shrew), both, "Longworth" and "Flap" being successful.

Since these modest beginnings the "Flap" trap has been used in conjunction with the "Longworth" to form the basis of the trapping activities of the Society, mostly in the Bristol district, towards our contribution to the National Mammal Survey.

The mechanism has remained unchanged from the early conception but the latest batches of traps to be constructed utilised a supply of aluminium screw-top containers of comparable size to the coffee jars used. These containers are used by the medical/chemical industry for the storage of pills, tablets, etc., in bulk. The main advantage of these aluminium bodies are a substantial saving in weight which is a considerable factor when it is now possible to put about forty of both tins and jars in the field per meeting if required. Another advantage of the aluminium type is that they can be dropped or thrown about indiscriminately without adverse effect.

Whilst this trap is not designed as a serious rival to the efficient "Longworth" it would be difficult not to draw some comparisons. Tables I and II show some typical field results, in the case of Table II on an occasion when both types of trap were used on the same exercise.

Species caught in "Flap" traps:—

Common Shrew (*Sorex araneus*)
Pygmy Shrew (*Sorex minutus*)
Water Shrew (*Neomys fodiens*)
Weasel (*Mustela nivalis*)
Wood Mouse (*Apodemus sylvaticus*)
Yellow-Necked Mouse (*Apodemus flavicollis*)
House Mouse (*Mus musculus*)
Bank Vole (*Clethrionomys glareolus*)
Field Vole (*Microtus agrestis*)

DATE	TRAPS	CATCHES	
		SPECIES	NO.
9 Nov. 1969	10 Flap	Wood Mouse Common Shrew	5 1
16 Nov. 1969	14 Flap	Wood Mouse Bank Vole Pygmy Shrew Common Shrew	4 1 1 2

Table (I)—Typical trapping results using "Flap" traps at Winterbourne Down, Glos.

20	←Longworth	Flap→	15	Traps
7	Wood Mouse		6	Catches
4	Bank Vole		3	

Table (II)—Results from Asham Wood, Som.

The main obvious advantage is in the cost. In actual performance the trap night/catch ratio of the "Flap" is of the order of 70 %, that of the "Longworth". However as each "Flap" is made individually by hand it might be fair to assume that a commercially produced jig-built version would improve on this figure. There are often signs that an empty trap has been, in fact, occupied during the night; one reason for malfunction being that if the bedding material is not packed in carefully an odd wisp can spring forward, preventing the flap from closing properly. The aluminium version is considerably lighter in weight than a "Longworth" and slightly less bulky to pack for carrying. The "Flap" is also multi-catch often containing two and, exceptionally, three mammals, sometimes of different species. This is not of course necessarily an advantage—certainly not, on the three occasions to date, for the inmate forced to share its last minutes with a weasel.

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SHEAR ZONES AND VEINS IN THE CARBONIFEROUS LIMESTONE NEAR THE OBSERVATORY, CLIFTON, BRISTOL

By Paul L. Hancock
(*Dept. of Geology, University of Bristol*)

Introduction

Some easily accessible and well-exposed shear zones, veins, joints and stylolites in limestones near the Observatory, Clifton, are described and their origins discussed. The structures are visible on the upper surface of a bed within the Clifton Down Limestone, a division of the Carboniferous Limestone Series. The bed is on the SE limb of the Westbury-on-Trym anticline which east of the Avon trends between 060° and 070° and plunges at 10° to 30° to the ENE. The locality is in an abandoned quarry about 100 m east of the Observatory (Camera Obscura) (ST 56657327). About 25 square metres of a sloping bedding plane have been polished by children sliding, consequently an unusual amount of structural detail is displayed.

The structures are exposed mainly as traces on the bedding plane, hence their geometry is most conveniently described in terms of pitch measured within the plane of the bedding from either the eastern or western end of its strike. Inspection of veins and joints exposed in three-dimensions on part of the back wall of the outcrop shows that many of them are approximately perpendicular to the bedding.

The following categories of surface are present:—

1. bedding surfaces;
2. stylolitic surfaces;
3. conjugate shear zones containing arrays of short en-échelon veins;
4. relatively long veins;
5. joints.

The arrangement of the principal structures within the polished area of the bedding plane is shown on Figure 1.

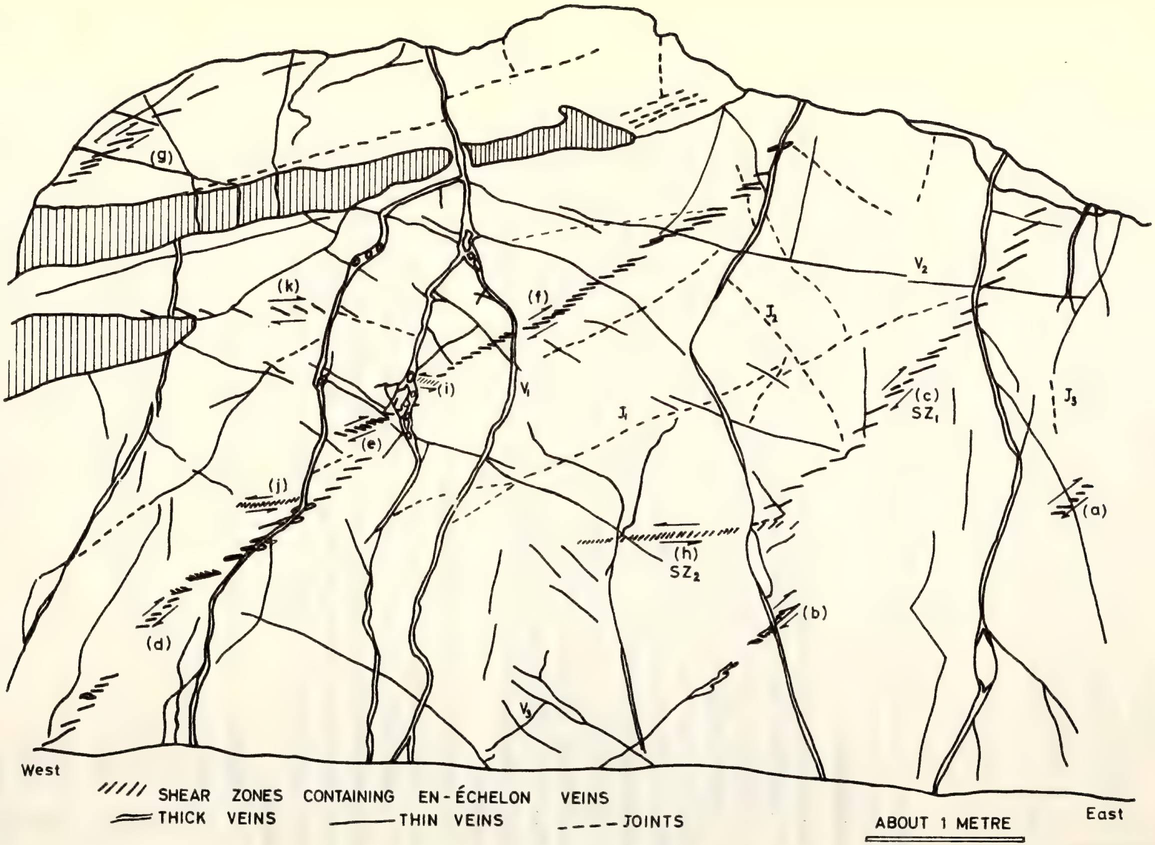
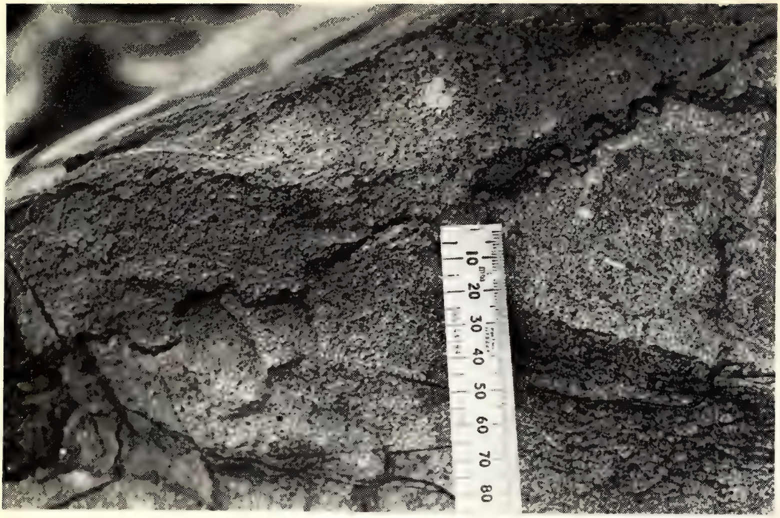

(g)
(k)
(f)
(i)
(e)
(j)
(d)
V₁
V₂
V₃
J₁
J₂
J₃
(c)
SZ₁
(a)
(h)
SZ₂
(b)
West
East
SHEAR ZONES CONTAINING EN-ÉCHELON VEINS
THICK VEINS
THIN VEINS
JOINTS
ABOUT 1 METRE

Fig. 1. Shear zones, veins and joints in Carboniferous Limestone near the Observatory, Clifton, Bristol. The diagram, which was drawn from a photograph, shows the relationships in plan between the traces of the structures as exposed within the polished area of the bedding surface which dips towards the lower part of the Figure. There is some angular distortion near the margins of the diagram. Veins at a small angle to the bedding and stylolite surfaces are not shown. Characterisitic traces of structures are indicated by symbols near to a representative member of the set, and the shear zones are lettered (a) to (k).



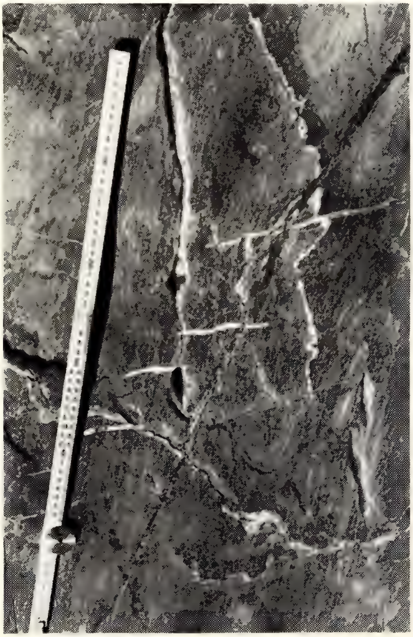


Plate IV

Upper: A stylolitic bedding surface. The rule is marked in millimetres.

Lower: Part of a shear zone containing en-échelon veins one of which is cut by the sinuous trace of a vein at a small angle to the bedding. A V_1 vein (dark) cuts two of the en-échelon veins and the vein at a small angle to the bedding. The rule is orientated parallel to the dip within the plane of the bedding.

Bedding and Stylolitic Surfaces

The bed dips 27° on a bearing of 161° and bears superficial scratches imposed by the sliding children. Some of the minor bedding surfaces within the layer are stylolitic (Plate IV, upper) indicating that pressure solution has occurred. There are also small stylolitic surfaces which are not parallel to the bedding. Pressure solution is one possible consequence of compression across a pre-existing surface and is an important mechanism of achieving bulk strain.

Shear Zones Containing En-Échelon Zones

Shear zones are approximately planar belts of finite width in which there has been strain accompanying the movement of the walls past each other. As Ramsay & Graham (1970) suggest they might be loosely termed 'ductile faults'. One type of shear zone is characterised by an array of en-échelon or pinnate veins generally containing quartz or carbonate minerals.

As may be inferred from Figure 2a one effect of shear along the margins of a zone is to generate a secondary stress system within the zone. The directions of the secondary maximum and minimum principal stresses are often at about 45° to the margins of the shear zone. An array of second-order extension veins commonly develops perpendicular to the direction of the secondary minimum stress and at 45° to the zone (Fig. 2b). Price (1970) has suggested that en-échelon extension veins are hydraulic fractures; a fracture mechanism which will be discussed later in the paper. In some shear zones en-échelon second-order Riedel Shears develop at 15° to the zone (Fig. 2b). En-échelon and pinnate veins may be used to determine the slip direction along a zone since they face against the sense of shear.

At the Observatory locality eleven shear zones, each containing an array of en-échelon, or more rarely pinnate (part of array (b)), carbonate veins, are visible within or near to the polished area of the bedding plane (Fig. 1 and Plates IV and V). The width of arrays at their maximum ranges from 2 to 15 cm and they vary in length from 0·15 to 2·3 m. There are between 5 and 35 veins per array, the average being 17. Veins are generally between 1·5 and 24·0 cm in length and from less than 1 mm to about 10 mm in thickness. In the narrower zones most of the veins are 1 mm or less in thickness, and they are closely spaced.

Viewed perpendicular to the bed, eight zones display dextral or right-handed shear, and three show sinistral or left-handed shear. Because the bed dips south at 27° the actual directions of slip, which are parallel to the lines of intersection between the zones and the

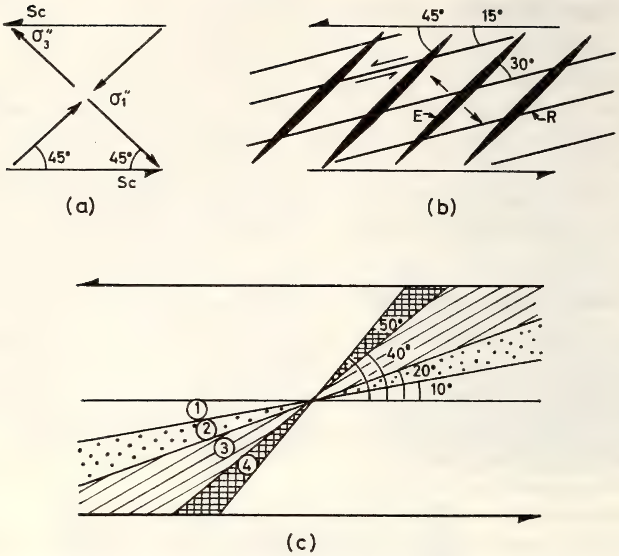


Fig. 2(a). The relation between a primary shear couple (Sc) and the directions of the secondary maximum principal stress (σ_1'') and the secondary minimum principal stress (σ_3'').

(b). En-échelon extension fractures (E) at 45° to a shear zone and en-échelon Riedel Shears (R) at 15° to a shear zone.

(c). Angular segments in which categories of en-échelon fractures may lie with respect to the margins of a shear zone developed when the primary effective stresses are all compressive.
Field 1—Displacement shears at 0° to 10° to the zone,
Field 2—Riedel Shears at 10° to 20° to the zone,
Field 3—Failure surfaces in the transition between shear and extension fractures at 20° to 40° to the zone,
Field 4—Extension fractures at 40° to 50° to the zone.

bedding, are oblique to the horizontal and vertical. Arrays (a) to (g) which are dextral and subparallel to each other make up shear zone set SZ_1. Arrays (h) to (j) which are sinistral and subparallel to each other form shear zone set SZ_2. Array (k) is dextral but subparallel to shear zone set SZ_2. Not only do dextral zones outnumber sinistral zones but they are also generally longer and wider. Inspection of Figure 1 shows that, excepting array (k), the two sets of zones make up a conjugate system of shears orientated approximately perpendicular to the bed and enclosing an average shear angle of 42° (Plate 2, upper). In a rock mass containing conjugate shears it is possible to infer the directions and relative magnitudes of the principal stresses. The acute bisectrix between the conjugate shears gives the direction of the maximum principal stress (σ_1); the line of intersection between shears gives the intermediate principal stress (σ_2), and the obtuse bisectrix gives the direction of the minimum principal stress (σ_3). Thus for the shear zones at this locality σ_1 and σ_3 were orientated parallel to the bed, although oblique to its strike and dip, and σ_2 was orientated perpendicular to the bed. The plunge of σ_1 inferred from conjugate shear zones which are orientated perpendicular to the limbs of a fold is commonly reported as being subparallel to the plunge of the fold. At this locality the angle of plunge of σ_3 is about the same as that of the axis of the Westbury anticline, where it closes in the neighbourhood of Southmead. The directions of plunge of the fold axis and σ_3 are both towards the eastern sector although at a high angle to each other.

At this locality the range of angles between planar en-échelon veins and the shear zones containing them is 20° to 46°, with maxima at about 30° amd 40°. Hancock (1972) has argued that second-order veins at 10°–20° to a zone occupy Riedel Shear directions, those at 40°–50° occupy extension fractures and those between 20° and 40° belong to the category of surfaces transitional between shear and extension fractures (Fig. 2c). Relative to the secondary direction of σ_1 within the zone, Riedel Shears develop at 25° to 35°, and veins occupying fractures in the transition between shear and extension surfaces form at 5° to 25°. Extension fractures form at 85° to 90° to the secondary direction of σ_3, that is subparallel to the secondary direction of σ_1.

Four of the zones (arrays (d), (e), (f) and (j)) contain some veins which have been deformed into gentle sigmoidal shapes as a consequence of continued simple shear after the veins were initiated (Fig. 3). The deformed veins like those reported from elsewhere

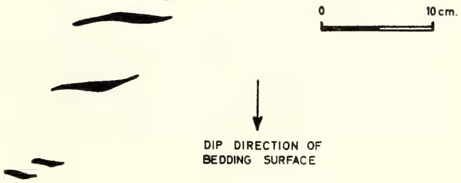


Fig. 3. Sketch from a photograph of a part of shear zone (f) showing gently deformed en-échelon veins.

show the greatest strain near to the median line of the zone. The sense of shear derived from their deformation accords with that inferred from their arrangement in the zones. Using curves given in Ramsay (1967, fig. 3-24) and Ramsay & Graham (1970, fig. 8) it is possible to calculate that the maximum shear strain (γ) in the centre of zones containing noticeably deformed veins is generally about $1{\cdot}5\gamma$, but that it rises to just over $2{\cdot}0\gamma$ in one zone.

In array (c) the central segment of one vein is subparallel to the zone; it may follow the displacement shear direction along that part of its length. Two veins in array (d) have short, pinnate, possibly third-order veins branching off them.

As Figure 1 shows, although zones (d), (e) and (f) are separate arrays they lie at a small angle to each other within the limits of a broader belt.

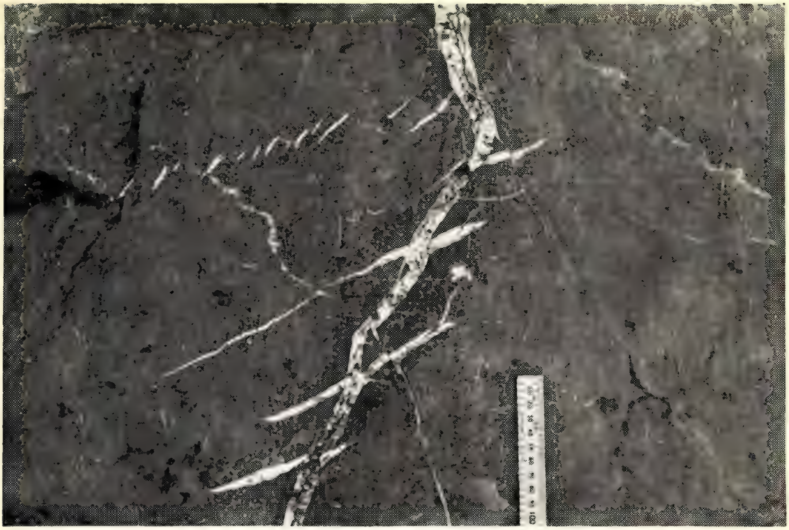
Many of the en-échelon veins are cut by longer veins belonging either to the group at small angles to the bedding or to sets V_1, V_2 and V_3 at high angles to the bedding (Plates IV lower and V). Thus it is concluded that the shear zones and the en-échelon veins are the oldest structures exclusive of bedding at the locality.

Long Veins

The oldest group of long veins make small angles with the bedding and they are cut by members of the three sets of younger veins, which are all approximately perpendicular to the bedding. Although the oldest veins are roughly planar their traces, or 'outcrops', on the polished bedding surface are sinuous (Plate I, lower). This sinuosity arises as a consequence of the bedding surface possessing a slight relief and the veins intersecting it at a small angle. For the same reason the 'outcrops' of the veins may be up to 3 cm in width despite the observation that few of the veins exceed 4 mm in thickness.

The traces of the younger sets of veins at a high angle to the bedding are approximately straight although many are irregular in detail. Most of them can be allocated to one of three principal directions: V_1 being the most conspicuous set and V_2 and V_3 thinner veins (Fig. 1).

Some veins in set V_1 are 3 cm in thickness and extend as somewhat irregular traces on the bedding for more than 3 m. Other veins in the set are thinner, straighter and shorter. The traces of many V_1 veins pitch at about 90° on the bedding, thus they are dip-veins. They are subparallel to nearby fissures some of which are filled by Mesozoic material. The red staining in some of the V_1 veins at this locality may be associated with the fissures. The margins of the thick



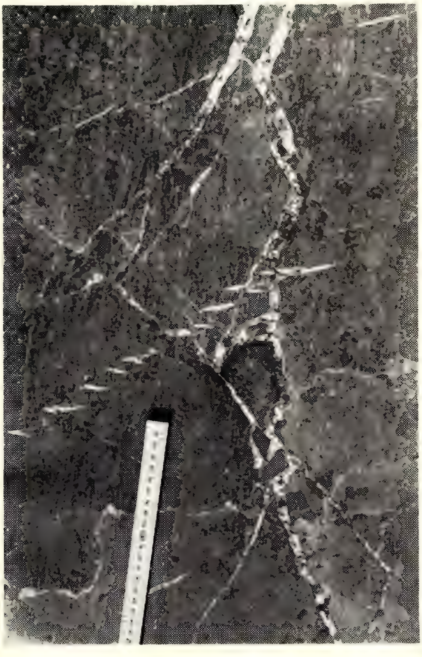


Plate V

Upper: Conjugate shear zones containing en-échelon veins some of which are cut, but not offset, by a thick V_1 vein. Rule as in Plate 1, lower.

Lower: A major V_1 vein containing brecciated limestone fragments and cutting some en-échelon veins in a shear zone. Rule as above.

veins are commonly irregular, angular and branching, and some of the thicker veins contain brecciated limestone fragments up to 13 cm in maximum length (Plate v, lower). Most of the breccia fragments are entirely supported by the vein material and are not in contact with each other or the vein margins. Although the thick V_1 veins are conspicuous their development caused a lateral extension of less than 3 per cent in the bed.

Thick V_1 veins cut members of all the other vein sets. Within the area of the polished bedding surface they were therefore the last veins to develop. As Plate v (upper) shows en-échelon veins in array (d) are cut by a major V_1 vein. Because, contrary to expectation, there are no offsets of the en-échelon veins across the V_1 vein, it is concluded that its opening involved not only dilatation but also a small component of sinistral shear which was sufficient to nullify the anticipated offsets.

The traces on the bedding of veins in sets V_2 and V_3 pitch at average angles of 41° from the east and 50° from the west respectively; the traces of V_3 veins being subparallel to shear zone set SZ_1. V_1 and V_2 veins rarely exceed 5 mm in thickness and they do not contain brecciated limestone fragments. On two V_2 veins there are a few millimetres of dextral displacement.

On a second bedding surface about 5 m south of the polished surface more veins are exposed. In addition to some of the sets already described there is a fourth set at a high angle to the bedding and intersecting it subparallel to the strike. One of these veins exceeds 10 cm in thickness and contains not only visible calcite crystals but also small grains of sulphide minerals.

The V_1 and en-échelon veins, and possibly the V_2 and V_3 veins are interpreted as hydraulic fractures. A hydraulic fracture is a variety of extension fracture, that is a rupture initiated perpendicular to the direction of the minimum principal stress. Hydraulic fracturing occurs when an abnormally high fluid pressure exceeds the value of the minimum stress by an amount equal to or greater than the tensile strength of the rock (Secor 1965, 1968; Phillips 1972; Price & Hancock 1972). The magnitude of the stress difference $(\sigma_1 - \sigma_3)$ should also be less than four times the tensile strength of the rock so that the development of shear fractures is inhibited. The responsible fluid may be either in the pore spaces of the rock or it may be introduced via cracks into the rock mass from more distant sources. Veins in sets V_1, V_2 and V_3 possibly originated in the latter way; the fluid from which the carbonate was precipitated passing through the fracture and causing it to propagate. The en-échelon veins may have developed by hydraulic fracturing when there was a fall in the value of the secondary minimum stress in a shear zone (Price 1970).

The appearance of the limestone breccias in some of the thick V_1 veins is not unlike that in some Welsh mineral veins described by Phillips (1972). He attributes the development of the Welsh veins to the influence of high pressure fluids on fracture planes, and the brecciation to the hydraulic bursting of the wall rocks when there was a temporary drop in fluid pressure on the fracture, but not in the adjacent wall rocks.

Joints

A joint is a barren fracture along which there is no evidence of slip. Although at this locality relatively few of the surfaces are joints in this sense they can be allocated to one of three sets all of which are orientated approximately perpendicular to the bedding. The longest and most abundant surfaces make up set J_1 whose traces on the bedding pitch at an average angle of 40° from the western end of the strike of the bed and subparallel to the traces of veins in set V_3. The traces on the bedding of sets J_2 and J_3 pitch on average at 67° and 75° respectively from the eastern end of the strike.

Price's (1959) view that joints form by the release of residual strain energy when rocks are uplifted into higher crustal zones after being compressed at greater depths is generally accepted. Joints are thus post-tectonic structures formed in brittle rocks, and are generally among the youngest structures in a rock mass.

Summary Structural History

The following sequence of structural events is proposed to account for the fractures visible within the polished area of the bedding surface.

1. Development of en-échelon veins in conjugate shear zone sets SZ_1 and SZ_2 when the limestone was semi-ductile and being compressed obliquely to the direction of its strike.
2. Formation of veins at small angles to the bedding.
3. Hydraulic fracturing and the development of vein sets V_2 and V_3.
4. Emplacement of vein set V_1 and the local brecciation of brittle limestone by hydraulic bursting in the neighbourhood of thick

V_1 veins. There was a small component of shear in addition to dilatation on some of the V_1 veins.

5. Development of joint sets J_1, J_2 and J_3 in very brittle limestone as a consequence of the release of residual strain energy attendant upon uplift.

As is often the case when the structural history of an individual rock mass is analysed a general trend from early compression to later extension, and from early ductile to later brittle behaviour can be established.

Acknowledgements

I wish to thank Drs. W. J. Phillips and N. J. Price for their helpful comments and Heather Hollingworth for drawing the figures.

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BOOK REVIEW

Snow and Storm on Exmoor

By Jack Hurley

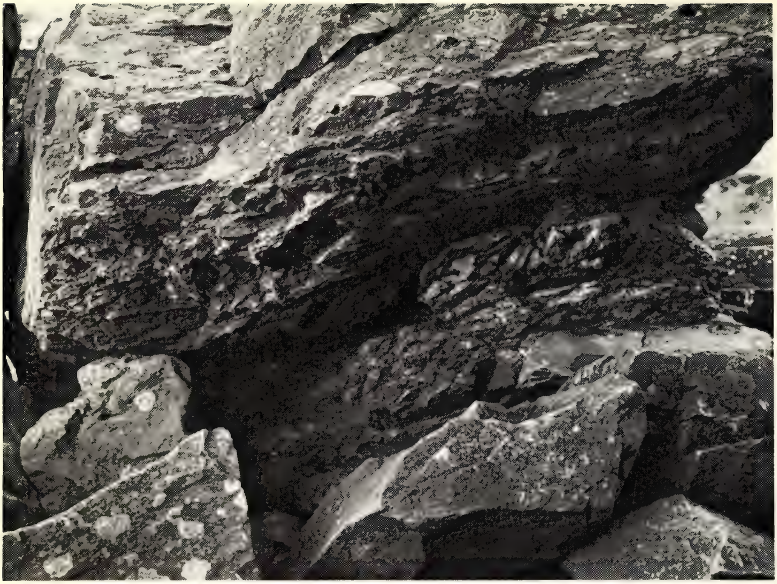
64 pages with one map, two line drawings and thirteen photographs. Exmoor Press; 50p.

This slim little volume, a further 'Microstudy' in the series edited by Victor Bonham Carter, grew from the author's desire to record Exmoor experiences in the great blizzard of 1963. It tells of the snowstorms of 1881, 1891, 1922, 1937 and 1963, the great storms of 1703 and 1900, and the floods of 1952 and the great frosts of 1940 and 1947. It is however more than a meteorological record; it is a description of the reactions of the animals and people of Exmoor and its neighbourhood to these natural calamities.

There are many tales of rescue, from the dragging overland of the Lynmouth lifeboat in 1899 to helicopter operations in 1963. One can read about the adventures of Sir Edward Mountain, Bart., of Arthur Priddle, a bus inspector, of Ann Dapling, a pregnant housewife, of Dr. Kidder, the Bishop of Bath and Wells, and of Winstanley, the builder of the first Eddystone Lighthouse.

The style of the book which contains much interesting information reflects the author's journalistic calling.

R. Bradshaw.



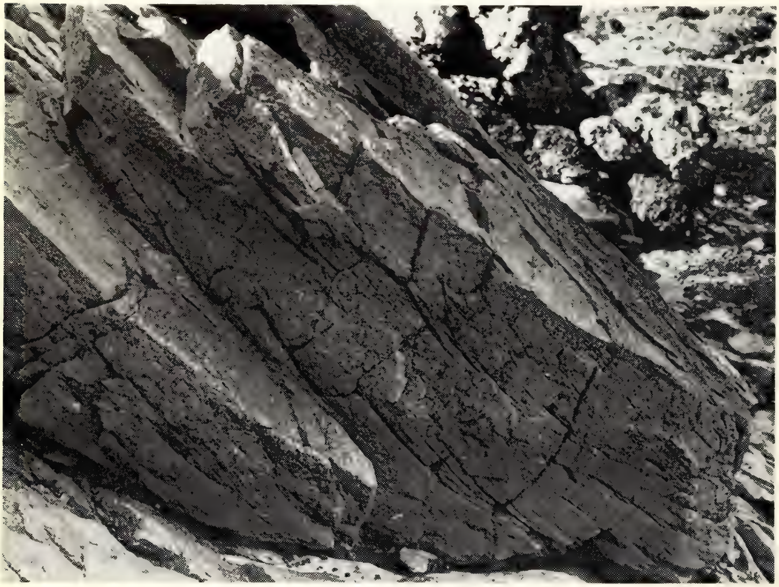


Plate VI

Upper: Channel lag deposit with clay ironstone fragments and *Calamites* stem casts. Width of outcrop is 2 m.

Lower: Trough-cross stratification in channel sandstone. Rule is 15 cm in length.

THE PENNANT SANDSTONE OF PORTISHEAD

BY J. T. G. STEAD AND B. P. J. WILLIAMS

(Departments of Geology, University College of Swansea and University of Bristol)

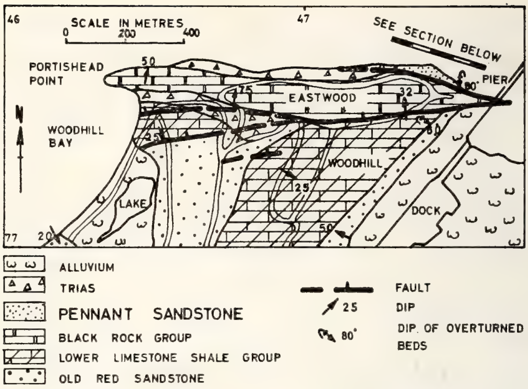
Introduction

In the area to the west of Bristol the main developments of the Upper Carboniferous Pennant Sanstone are found in the Nailsea Basin and the Clapton to East Clevedon area but north of these a small exposure of Pennant Sandstone crops out on the coast near Portishead (ST 475 776). Here the sandstone is faulted against the Carboniferous Limestone and is unconformably overlain by Triassic conglomerates and sandstones (Fig. 1). The fault is probably not of great magnitude since the Pennant Sandstone in this region unconformably overlies the Lower Limestone Shale Group ('K' zone) of the Carboniferous Limestone Series (Kellaway and Welch, 1948, p. 27). Small inliers of Carboniferous Limestone are exposed within the Pennant Sandstone of the Clapton area.

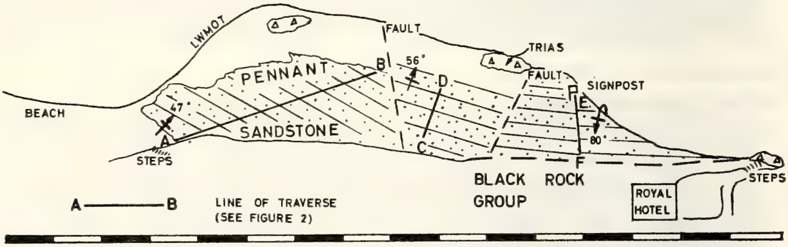
The exact stratigraphical level of the Portishead Pennant Sandstone within the Upper Coal Measures is not known with any certainty because of the absence of any coal seams to act as marker horizons. On lithological grounds it appears to be either part of the Mangotsfield Group or the upper part of the Downend Group (Lower Pennant Measures).

Description of Section

The rocks described here are exposed from ST 4726 7767 to ST 4761 7752 comprising essentially a strike section with beds dipping mainly towards the north-east. Near the eastern end of the exposure the dip steepens to the vertical and at the signpost at the extreme eastern end the beds are overturned dipping south-westwards at 70°–80° (Fig. 1). The overturning of the strata is probably due to the proximity of the fault zone which throws the Pennant Sandstone against the Black Rock Group. A few isolated patches of Triassic sandstone and conglomerate overlie the Pennant Sandstone and further west Triassic rocks are continuously exposed along the beach.


46
SCALE IN METRES
0
200
400
47
SEE SECTION BELOW
PORTISHEAD POINT
WOODHILL BAY
EASTWOOD
WOODHILL
PIER
LAKE
DOCK
N
50
75
32
25
80
25
50
20
77
ALLUVIUM
TRIAS
PENNANT SANDSTONE
BLACK ROCK GROUP
LOWER LIMESTONE SHALE GROUP
OLD RED SANDSTONE
FAULT
25 DIP
80° DIP OF OVERTURNED BEDS

GEOLOGICAL SKETCH MAP OF THE PORTISHEAD AREA


LWMOT
FAULT
TRIAS
FAULT
SIGNPOST
PENNANT
SANDSTONE
BEACH
STEPS
47°
56°
80°
A
B
C
D
E
F
BLACK ROCK GROUP
ROYAL HOTEL
STEPS
A —— B LINE OF TRAVERSE (SEE FIGURE 2)

DIAGRAMATIC SKETCH MAP OF THE MEASURED SECTION.

Fig. 1. Location of Pennant Sandstone section.

The vertical log (Fig. 2) is composite and the lines of traverse are indicated on Figure 1. The sequence is composed of 18–20 m of medium to coarse grained sandstones of litharenite (Folk, 1968) composition. Petrographical analyses of the sandstones reveal an average quartz content of 57 per cent while feldspar and rock fragments total 10 and 33 per cent respectively. The rock fragments include metamorphic, sedimentary (mainly intraformational mudstone fragments) and igneous types, and, after adjusting the rock fragment content to one hundred per cent, averaged 12, 70 and 18 per cent respectively. In some thin sections the matrix component of the sandstone averaged 7·7 per cent while the overall sorting value was ·55 and skewness averaged + ·22. The sandstones can, therefore, be generally classified as litharenites although some fall into Folks' (1968) feldspathic litharenite category.

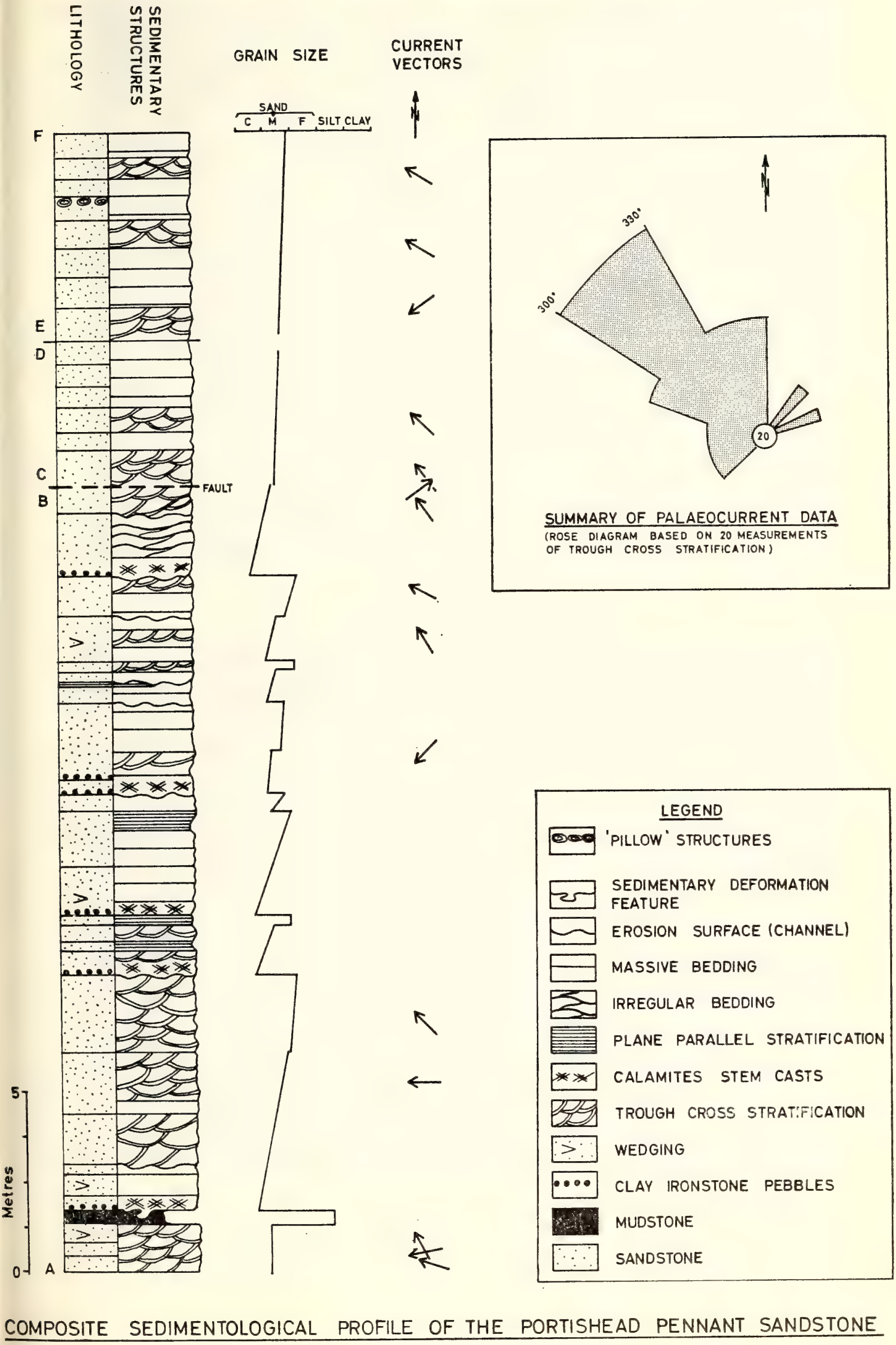

LITHOLOGY
SEDIMENTARY STRUCTURES
GRAIN SIZE
CURRENT VECTORS
SAND
C M F SILT CLAY
F
E
D
C
B
A
FAULT
Metres
0
5
330°
300°
20
SUMMARY OF PALAEOCURRENT DATA
(ROSE DIAGRAM BASED ON 20 MEASUREMENTS OF TROUGH CROSS STRATIFICATION)
LEGEND
'PILLOW' STRUCTURES
SEDIMENTARY DEFORMATION FEATURE
EROSION SURFACE (CHANNEL)
MASSIVE BEDDING
IRREGULAR BEDDING
PLANE PARALLEL STRATIFICATION
CALAMITES STEM CASTS
TROUGH CROSS STRATIFICATION
WEDGING
CLAY IRONSTONE PEBBLES
MUDSTONE
SANDSTONE
COMPOSITE SEDIMENTOLOGICAL PROFILE OF THE PORTISHEAD PENNANT SANDSTONE

Fig. 2. Vertical profile of the Portishead Pennant Sandstone. (Line of traverse A–B is continuous, whereas C–D and E–F may or may not be continuous).

Apart from a silty mudstone unit 30 cm in thickness near the base (Fig. 2) there are no argillaceous deposits. Most of the sandstones are trough-cross stratified though some plane-parallel stratification with primary current lineation on bedding surfaces is also present. Several scoured erosional surfaces occur followed by coarse sandstones with abundant clay ironstone fragments, frequently seen weathered out on exposed surfaces, and *Calamites* stem casts. These facies types are typical of the Pennant Sandstone sequence in the South West Province. Occasional reddening due to haematite staining may be attributed to downward migration of iron oxides from the Triassic cover.

EROSIONAL SEDIMENTARY FEATURES

CHANNELLING

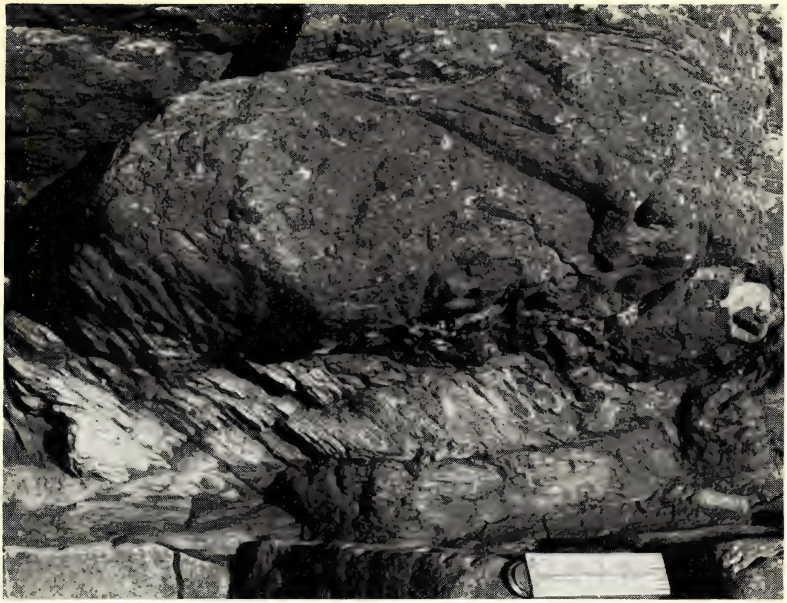
Channelling phenomena displayed in this sequence are represented by the erosional surfaces followed by coarse grained sandstone with clay ironstone lag deposits and stem casts (Plate VI, upper). Alluvial sediments are characteristically composed of sequences which fine upwards in grain size (Allen 1965). However this feature is not always demonstrable in the Lower Pennant Measures. Studies of rates of accretion on floodplains and migration of channels in present day rivers (Wolman and Leopold, 1957) show that the topstratum deposits are cut away by migrating channels and the bulk of the preserved sediment is the result of in-channel sedimentation. This is true of the present sequence. Elsewhere in the Lower Pennant Measures of the South West Province, topstratum deposits do occasionally occur in association with similar sandstone sequences.

The classical criterion of alluvial deposits is a U-shaped channel form but the lateral migration of channels often causes a planar or slightly undulating erosion surface with no indication of the original channel morphology.

DEPOSITIONAL SEDIMENTARY FEATURES

IRREGULAR BEDDING

The coarser sandstones just above erosion surfaces are frequently irregularly bedded. They are associated with large clay ironstone clasts and plant stem casts, suggesting powerful flow conditions



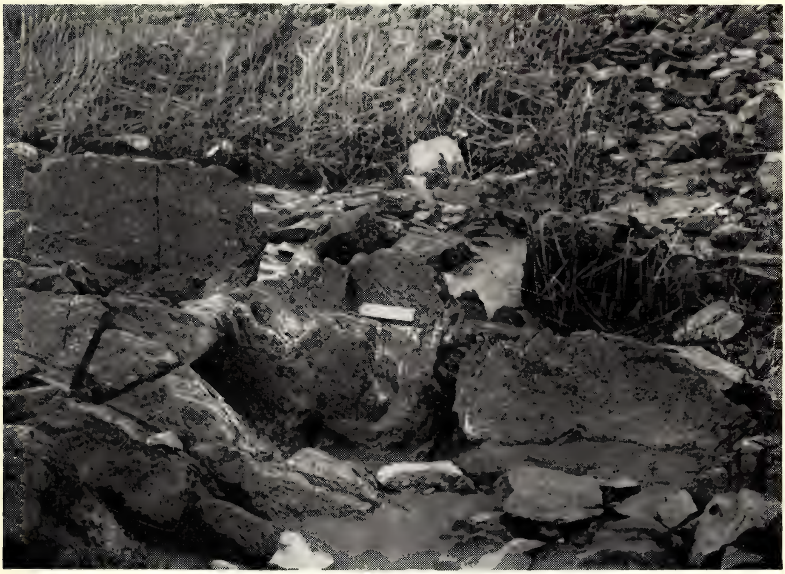


Plate VII

Upper: Asymmetric load structure at the base of a slipped sandstone sheet. Note shear effect in the underlying mudstone. Rule is 15 cm in length.

Lower: Concentric joints in overturned sandstone bed. Rule is 15 cm in length.

associated with the cutting of a new channel, probably associated with an upper flow regime situation (Kelling, 1968).

TROUGH-CROSS STRATIFICATION

This ubiquitous structure is almost tabular with shallow troughs cut into the underlying bed (Plate VI, lower). Two or three sets may make up one unit, but quite commonly only one set is present. The foresets are concave downward, downward tapering and asymptotic. The inclination varies from 25° to 2° in 'a c' sections and grades into plane-parallel stratification.

The cross stratification represents the internal structure of sand bars formed in the middle part of the lower flow regime (Harms and Fahnestock, 1965). These may have been point bars or longitudinal bars in a major alluvial channel. The average range in unit thickness is 60 cm indicating a depth range of 1·9 to 13·1 m (Allen 1963). The orientation of the cross stratification reveals the direction of flow at the time of deposition. In the Portishead section the main mode is directed towards the north-west but some vectors are at variance with this mode and these are here ascribed to meandering effects (Fig. 2). The implication is that the main direction of river flow was towards the north-west. This direction conforms to the regional palaeocurrent patterns in the Lower Pennant Measures of Bristol and Somerset, South Wales and the Forest of Dean (Kelling, 1969; Gayer and Stead, 1971).

PLANE-PARALLEL STRATIFICATION

In this type of stratification the laminae are not inclined to true bedding and a flaggy aspect results with bedding surfaces displaying elongate patches of low relief known as primary current lineation. This structure forms under conditions of stronger flow in the transition to the upper flow regime (Harms and Fahnestock 1965).

DEFORMATIONAL SEDIMENTARY FEATURES

These features, commonly called 'slump' phenomena, are particularly well seen in the lower end of the section at ST 4726 7767. Here penecontemporaneous sediment deformation has occurred in the lower part of a thick sandstone unit which overlies the 30 cm silty mudstone bed (Fig. 2). At one point, a load cast of an asymmetric pillow form may be observed at the base of a slipped sandstone sheet (Plate VII, upper). The displacement of the mudstone and the development of cleavage in the upper part of the unit are probably a result of sliding towards the west-north-west and north. At this locality striking weathering effects associated with jointing and migration of iron oxide may be seen.

OTHER FEATURES

Near the eastern end of the section (ST 4752 7754) spectacular 'pillow'-like structures are displayed in the Sandstone (Plate VII, lower). Consideration of the geometry of the trough-cross stratification in relation to the structural dip at this point indicates that the beds are locally overturned. The 'pillows' are almost 1 m in diameter with concentric internal layers. With one exception they appear almost spherical in the exposed section.

Two main theories have been advanced regarding the mode of origin of these features elsewhere. Firstly, that they are sand balls or pillows formed by vertical foundering of unconsolidated sediment shortly after deposition (cf. Kuenen, 1958; Hubert *et al.*, 1972) and, secondly, that they represent concretions formed chemically in unconsolidated sediments as a result of increased pH shortly after deposition.

The present study revealed that the 'pillows' are actually due to concentric joints of tectonic origin. The evidence for this conclusion is gathered from:—

(a) the absence of a mudstone substrate to produce foundering required for the formation of sand pillows.

(b) the completely concentric form of the pillows, as normally sand pillows show internal laminations which are synclinal in form (Kuenen, 1958). Frequently, also, the top side is truncated but this is not so here.

(c) the apparent laminae are parallel throughout and, if they were deformed foresets, some tapering should be obvious. Plane-parallel lamination is unlikely to be associated with foundering because the compaction factor is very high. Cross stratification may produce very loose packing due to avalanche effect (Allen, 1972).

(d) the adjacent low angle cross stratified sandstone units display incipient concentric joints which can be seen cutting across the sedimentary layers. These joints are discontinuous and are clearly an intermediate stage in the development of the 'pillows'.

Conclusions

The sedimentary features of the Pennant Sandstone of Portishead are outlined here for the first time. Apart from one enigmatic feature to which a tectonic origin is ascribed, the sedimentary structures indicate deposition of sediment in an alluvial regime. The Sandstone is essentially litharenite in composition and was deposited by rivers flowing towards the north west. This dispersal pattern is consistent with the palaeocurrent pattern for the Pennant Sandstone of the South West Province.

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G. MUNRO SMITH	10
Miss I. M. ROPER	13
G. C. GRIFFITHS	17
ERNEST (later Sir Ernest) H. COOK	19
H. WOMERSLEY	22
Professor O. V. DARBISHIRE	24
JAMES RAFTER	27
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The dates given are those of election to office.

MEMBERSHIP OF THE BRISTOL NATURALISTS' SOCIETY

Anyone interested in Natural History may apply to join the Society as a Full member. The annual subscription is £2·00. Members of the household of a Full Member may become members for an annual subscription of 75p. Persons residing outside a radius of twenty miles from the City Centre of Bristol qualify for a reduced annual subscription of £1. There are also Junior membership facilities for persons between the ages of 12 and 18 years at the reduced subscription of 50p. A prospectus giving fuller details of the privileges of the various classes of membership may be obtained from the Honorary Treasurer:—

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PROCEEDINGS

OF THE

Bristol Naturalists' Society

EDITED BY J. W. COWIE
ASSISTED BY A COMMITTEE

"Rerum cognoscere causas"—Virgil

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UNIVERSITY WALK,
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NOT LATER THAN FEB. 28.

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G.SWEET

Ex officio the Professors of Botany, Geology and Zoology at the University of Bristol.

The membership at the end of the year was 812 including 79 juniors. There are 10 affiliated societies. At the Annual General Meeting the Officers and Members of Council were elected with Mrs.A.Hollowell continuing as President.

The Annual Dinner was held in March in the Senior Common Room of the University with Mr.P.Thodaye of Bath University as the Guest Speaker on the subject of "Amusing Plants".

In June the Society held a Wine and Cheese Party in the Orangery of Goldney House, Clifton; this was a well attended and successful event.

The Society has revised and reprinted its prospectus. The illustration on the cover of this was kindly executed for the Society by Mrs.A.Gregory.

A joint meeting was held with the Western Branch of the Institute of Biology, at which Mr.D.Cram spoke about his research into the fish population in seas off South West Africa.

Over twenty-five local Societies were invited to a meeting on "The History and Natural History of Hedgerows" addressed by Dr.F.H.Perring of the N.E.R.C. Biological Records Centre. Following this Mr.P.Fowler of the University's Extra-mural Department asked the B.N.S. for help with a survey of the hedges of Row of Ashes Farm, near Butcombe in Somerset. A dozen members surveyed 3½ miles of hedges, recording the numbers of shrub species in successive 30-yard lengths of hedge. Conclusions as to the ages of the hedges, based on this survey, will be compared with documentary evidence as a stage in assessing the reliability of this type of hedgerow survey in determining the ages of Somerset hedges. The initial arrangements for this survey were undertaken by the Botanical Section.

The monthly bulletins have been assembled, folded and placed in their envelopes each month by Mr.A.P.Richards and Mr.C.S.Carlile. About one-third of the envelopes have then been delivered by hand by a team of volunteers: Mrs.G.A.Winn, Mrs.H.Elliot, Mrs.M.L.Prior, Mrs.R.C.Hulbert, Miss J.M. Dickson, Mr.R.Chadwick, Mr.C.Leake, Miss W. Taylor, Miss B.A. Rake, Mr.A.P.Richards and Miss M.E. Jervis. This work represents a considerable financial saving to the Society.

With deep regret we announce the deaths of Mr.F.W.Evens, Prof.Macgregor Skene, Miss E.N. Stott and Mr.W.Upton during 1973, and of Mr. H.H.Davis on Jan.2, 1974.

AUDREY HECKELS, *Hon. Secretary*

REPORT OF THE CONSERVATION COMMITTEE, 1973

The field survey of interesting habitats and semi-natural areas in South Gloucestershire has continued throughout the year, and it is hoped that maps and schedules will soon be available for the Gloucestershire Trust.

Support was tiven to the local protest against rubbish tipping over a large area of marshy grassland at Lawrence Weston. Discussions took place with Councillors and with Corporation staff, and the proposals for tipping have been withdrawn. A successful request was made to the Nature Conservancy for Bodkin Hazel Wood in South Gloucestershire to be designated as a Site of Special Scientific Interest. An area of woodland and meadow land at Stockwood Vale was investigated on behalf of the local community group and support given to their proposal that the area should be retained as a natural amenity.

Action was taken to prevent damage to *Sorbi* from contractors' plant and equipment during road widening of the Portway in the Gorge section.

Support was given to the call by the Cheddar Action Group for a public enquiry into the Butts Combe Lime Kiln proposals. Although the enquiry was not granted, fears of environmental damage have been largely allayed by the stringent conditions imposed. However, steps are being taken to watch for possible adverse effects on the flora when the plant is in operation.

The best method of safeguarding the interests of nature conservation within the new Avon County has been a major concern of the Committee. A paper setting out various methods was circulated to The Somerset Trust, The Gloucestershire Trust, Bath Natural History Society, Bristol Ornithological Club and the B.N.S. Council, and this formed the basis of discussion at a meeting convened for delegates from these bodies. Agreement was reached on the formation of a Joint Management Committee for Avon County representing The Gloucestershire Trust, The Somerset Trust and the B.N.S.

K.T.BATTY, *Chairman*

REPORT OF BOTANICAL SECTION, 1973

At the Annual General Meeting in the Botany Department Herbarium on 22nd January, 1973, the following were elected. President: Dr.A.F. Devonshire; Secretary & Treasurer: Miss I.F. Gravestock; Committee: Dr.T.E.T.Bond, Dr.D.H.Brown, Mrs.C.H.Cummins, Mrs.N.Vaughan Davies, Mr.C.H.Hurfurt, Mr.P.J.M.Nethercott, Dr.D.H.Peregrine and Dr.C.E.D. Smith.

Following the General Lecture on "The History and Natural History of Hedgerows" by Dr.F.H.Perring, the Section organised two meetings at which members assisted Mr.P.Fowler of the University Extra-mural Department in a hedgerow survey on a Somerset farm (see Report of Council for further details).

The following winter meetings were held:-

Jan.22: Annual General Meeting and a Further Progress Report on the Somerset Flora, by Capt.R.G.B.Roe; also Members' Evening.
Feb.26: Plant Hunting in Afghanistan, by Dr.T.F.Hewer.
Mar.26: Flowers of the Antipodes, by Mrs.N.Vaughan Davies.
Oct.22: Members' Evening, with transparencies.
Nov.26: The Flora of South-west Spain, by Mr.C.H.Cummins.

The following field excursions took place, under the leadership of those shown:-

Mar.31: Frome Valley, for bryophytes. Dr.J.L.Dobbie.
Apr.28: R.H.S. Gardens, Wisley, Ripley, Surrey. Dr.A.F.Devonshire.
May 22: Stockwood Vale. Mr.C.H.Hurfurt.
June 2: Cheddar Gorge. Mr.P.J.M.Nethercott. *Geranium sanguineum, Meconopsis cambrica, Hieracium schmidtii* and *Dianthus gratianopolitanus* were flowering. *Sedum forsteranum, Sorbus anglica, Thalictrum minus, Cochlearia officinalis* and a colony of *Ophioglossum vulgatum* away from the cliffs were also seen.
June 12: Exploring the L.M.S. Dr.A.F.Devonshire.
July 7: River Yeo, Congresbury area. Miss J. Cox.
July 24: Bank of the Avon, upstream. Dr.D.H.Peregrine. *Potentilla recta, Potamogeton nodosum* and *Cuscuta europaea* were among the plants found.
July 28: West Kington and Castle Combe. Mr.C.H.Cummins.
Aug.11: Saltford disused railway line. Miss I.F.Gravestock.

Sept.1: Chew Valley area. Mr.P.J.M.Nethercott. *Senecio fluviatilis* was still abundant by the R. Chew in one of two localities.

Oct.14: Fungus Foray to Priddy. Mr.J.H.Kemp.

I.F.GRAVESTOCK, *Hon. Secretary*

REPORT OF ORNITHOLOGICAL SECTION, 1973

At the 49th Annual General Meeting, Mr.J.D.R.Vernon was elected President in place of Mr.P.J.Chadwick, and Mr.R.L.Bland was elected Secretary in place of Mr.H.R.H.Lance. Miss R.C. Lee and Messrs. Ogilvie, Thomas and Bigger were re-elected to the Committee, and Messrs. Shepherd and Ogbourne and Mrs.J.Humphris were elected to it. Mr.S.M.Taylor was re-elected Assistant Secretary, and Mr.Billett, Auditor.

Nine indoor meetings were held during the year, with an average attendance of 63. They included talks on the Birds of Finland, the Carmargue, and Gloucestershire, The Geese at Wexford Slobs, and (by the Director of the B.T.O.) on Enjoying Birdwatching.

Thirteen field meetings were organised, a number of them to places in the immediate neighbourhood, others to Dawlish Warren, Portland Bill, Gwynne Fechan, and the Quantocks.

The year saw a thorough survey of the Rookeries of North Somerset, a Kestrel month, and the beginnings of a survey of local Churchyards, and of a survey into the birds using gardens in towns. Members of the section also contributed to the B.T.O.'s National Nest Record and Ringing Schemes, and to the Birds of Estuaries Enquiry. Preliminary work was begun on the Register of Ornithological Habitats.

R.L.BLAND, *Hon. Secretary*

REPORT OF MAMMAL SECTION, 1973

At the Annual General Meeting on 17th January, the following were re-elected: President: Mr.R.G.Symes; Secretary and Treasurer: Miss E.J. Lenton; Recorder: Mr.R.G.Symes; Committee members: Miss J.B. Webb, Messrs. Curber, Jayne, Rawlings and Walker and Dr.R.J.G.Savage.

Six indoor meetings were held during the year:-

Jan.17: Annual General Meeting and Presidential address: Facts and Fables about Rats and Mice.
Feb.9: Muntjac, by Dr. Oliver Dansie.
Mar.23: Members' Evening.
Oct.23: Nature's Sketching Grounds, by Miss Rita Parsons.
Nov.20: Mammal Workshop
Dec.18: The Living Forest, filmed by Eric Ashby, was shown by courtesy of the BBC in place of Professor Mellanby's lectureson Moles, unfortunately cancelled owing to the transport situation.

Field meetings were as follows:-

Jan.21: Priddy Pools. Mr.R.G.Symes.
Feb.4: Fox Spotting. Mr.F.H.Rawlings.
Feb.25: Forest of Dean. Mr.A.F.Jayne.
Mar.18: Magor Reserve. Miss E.J.Lenton.
Apr.8: Goblin Combe. Mr.G.Walker.
Apr.13, 20, 27, May 4, 11, 18: Badger Watches. Mr.A.F.Jayne.
May 12: Cotswold Wildlife Park. Mr.F.H.Rawlings.
June 24: Loxton. Miss J.B. Webb.
July 14: Friary Wood. Mr.R.M.Curber.

Aug.5: Survey Meeting. Mr.R.G.Symes.
Sept.9: Lancaut, Forest of Dean. Mr.A.F.Jayne.
Oct.5-7: Pembrokeshire. Miss E.J. Lenton.
Oct.21: Harvest Mouse Survey. Mr.S.Harris.
Nov.25: Field meeting cancelled and members asked to record in their own localities, to save petrol.
Dec.30: Bristol Mammals. Mr.R.H.Rawlings.

Members are continuing to contribute to the Mammal Society's national distribution mapping scheme as well as to the Section's local one. They are also helping with the new national surveys on harvest mice and otters.

E.J.LENTON, *Hon. Secretary*

REPORT OF GEOLOGICAL SECTION, 1973.

The Annual Business Meeting of the Section was held on 17 January, 1973, in the Geology Lecture Theatre of the University. The following were elected: President, Mr.T.Harrison; Vice-President, Mr.A.E.Frey; Hon. Secretary, Dr.A.B.Hawkins; Hon. Field Secretary, Mr.D.Hamilton; Committee: Professor D.L. Dineley, Student President of the University Geology Society (both *ex-officio*), Mrs.Hamilton, Mr.Hollingsworth, Dr.Insole, Miss Pounder, Mr.Thompson.

The programme included:-

Feb.22: "Plate Tectonics in the Eastern Mediterranean Region", Dr.P.L.Hancock.
Mar.22: "The Old Red Sandstone of Pembrokeshire". Dr.B.P.J.Williams.
Oct.25: "Mineralogy of the South Wales Coalfield". Dr.D.J.N.Firth.
Nov.29: "Tertiary Events in South West England". C.Bristow.

The following field meetings took place:-

May 12: Wick Quarries. Dr.J.W.Murray.
June 17: The Malverns. Dr.D.L.Speedyman
Sept.30: The North Crop of the South Wales Coalfield. Dr.B.P.J.Williams.

A.B.HAWKINS, *Hon. Secretary*

REPORT OF ENTOMOLOGICAL SECTION, 1973.

At the Annual Business Meeting of the Section on January 15 the following were elected: President and Secretary, G.R.Best. Due to the continued low numbers supporting the section, all active members to be eligible to serve on the Committee. The attendance at the Annual Exhibition was the best for many years.

Meetings held throughout the year were as follows:-
June 17: Spiders and Beetles, Leigh Woods. G.R.Best.
July 21: Purple Emperors, Blackmoor Copse. A.N.Grose.
Aug.25: Moth Trapping, Almondsbury. G.R.Best.
Sept.29: Amateur Entomologists' Exhibition, London. (with Juniors). G.R.Best and Dr.C.E.D.Smith.
Nov.6: Annual Exhibition. City Museum.

G.R.BEST, *Hon. Secretary*

ACCOUNT OF GENERAL MEETINGS 1973

Our first meeting of the year on 18th January was an address by our President, Mrs.A.Hollowell, on "Some Thoughts on Diversity and Abundance".

Feb.1: Dr.F.H.Perring spoke on the "History and Natural History of Hedgerows". Research has shown that the age of hedgerows can be determined from their botanical composition; they are living archaeological documents.

Mar.1: Mr. Bryan Sage spoke on "Oil and Wildlife in Arctic Alaska". A film, "The Living Tundra", portrayed both the wildlife and physical aspects of the Arctic Tundra and showed how they are inter-related.

Oct.4: Mr.Wilks, a Tree Surgeon and author of several books on Trees, spoke on the "History of Trees".

Nov.7: Mr.J.H.Barrett, formerly the Director of the Pembrokeshire Countryside Unit, spoke on "The Coastal Scene". Mr.Barrett warned of the impact of man, the spread of concrete and the pollution of the seas.

Dec.6: "Members' Evening". Short accounts by members of their experiences in various parts of the world: Miss R. Lee on Island Holidays; Dr.A.F.Devonshire on a Story of a British Town; Miss E. Fleure on a Holiday in Tunisia; Dr.R.J.G.Savage on A Trip in East Africa; Dr.J.W.Cowie on a Journey to Siberia; Dr.D.H.Peregrine on American National Parks, and Mr.M.Collins on Bats.

AUDREY HECKELS, *Hon. Secretary*

GENERAL FIELD MEETINGS 1973

Thirteen field meetings were held during the year and were generally well attended. Four midweek rambles were also held. A list of the field meetings with leaders, places visited, and an indication of the main points of interest is given below. Fuller details are kept in the records of the Field Committee. In the following list the leader is given first, followed by the area visited.

Jan.14: H.G.Hockey. Wentwood Reservoir and Forest. A visit to the Reservoir for birds, and a walk over Gray Hill.

Apr.20: H.G.Hockey. Will's Neck, Quantocks. A ridge walk along the top of the Quantocks.

May 9: D.A.C.Cullen. Frome Valley. Evening bird song near Snuff Mills.

May 16: Miss E.J. Vinnicombe. Ashton Court. A Wednesday afternoon walk round the Nature Trail.

May 19: A.F.Devonshire. Forest of Dean. A walk round part of the Wilderness Nature Trail near Mitcheldean. During the journey the old railway and tramway system of Dean was observed.

June 3: Miss R.C. Lee. Gower. Oxwich Nature Reserve; a rich sand dune flora; seabirds. A 3½ mile cliff walk to Rhossili; cliff flora, geological formations and seabirds.

June 6: H.G.Hockey. Rowberrow Warren. An evening walk from Rowberrow Church to the top of the Warren. Plants, birds and caves.

June 27: A.F.Devonshire. Bristol Forest. An afternoon walk round the Nature Trail, cut short by rain.

July 1: Miss E.J. Vinnicombe. Braunton Burrows and Croyde Bay. At Braunton Burrows there was a rich sand dune flora, including *Matthiola incana* and several orchids. At Croyde Bay, cliff flora and birds.

July 17: Miss C. Groves. Backwell Hill and Bourton Combe. A Tuesday afternoon walk from Winford Turning on Bridgwater Road to the mouth of Bourton Combe.

July 19: Miss E.J. Lenton. Kennet & Avon Canal. A 4-mile evening walk along the canal from Bathampton to Dundas aqueduct. Water plants and birds.

Aug.4: Miss C. Groves. Compton Acres and Old Sarum. Compton Acres is a remarkable garden near Bournemouth, comprising ten individual gardens of different styles. Old Sarum is the old site of Salisbury.

Aug.15: Mr. & Mrs.G.H.Dudden. Purdown. An afternoon walk over Purdown, starting from Muller Road.

Aug.18: R.M.Curber. Pennington Marshes. A walk along the sea wall to see waders and sea birds.

Sept.16: D.Hamilton & Mrs.M.P.Hill-Cottingham. Ogmore-on-Sea and Dunraven. At both places the marine biology and geology were studied.

Oct.28: H.G.Hockey. Broker's Wood, Westbury, Wilts. This wood has been converted into a woodland park with a lake. At the adjacent Round Wood there is some interesting forestry.

Dec.2: Miss R.C. Lee. Durleigh Reservoir; wild fowl. A walk from Minehead to Dunster Beach; birds, including water rails.

A.F.DEVONSHIRE, *Hon. Field Secretary*

REPORT OF THE LIBRARIAN, 1973.

This year the Society has been able to add over twentyfive new books to its library, and has also been fortunate in receiving several donations of books and of back numbers of journals from members and friends. New accessions have been announced from time to time in the *Bulletin* of the Society.

Over 220 loans have been issued to 44 different borrowers, and the library has been visited on 120 different occasions.

Space continues to be the library's most pressing problem, brought to a head at the end of the year when the library committee received a request to remove our foreign journals from the Queen's Building Library of the University. The committee is considering alternative methods of storage for for some of these journals, and is reviewing the library's stock with renewed urgency.

Thanks are due once more to the Librarian-in-charge of the Queen's Building Library, University of Bristol, and to the Director of the City Museum, Bristol, for their continuing assistance.

JENNIFER SCHERR, *Hon. Librarian*

1972 £		£ p	£ p
	Members' Subscriptions		
1,066	Full Members	1,077.62	
92	Full Members of the same household	90.00	
27	Corresponding Members	28.50	
9	Associates	17.00	
35	Juniors	38.00	
27	Affiliated Societies	19.25	
			1,270.37
4	Donations		4.00
153	*Proceedings*		
	Authors' contributions	5.00	
	Grants	45.00	
	Offprints	73.08	
	Sales	39.08	
	Advertisements	10.57	
			172.73
	Field Committee: Profit		8.15
	Sale of badges		1.20
12	Profit on Dinner and Cheese & Wine Party		12.84
	Interest on deposit account		46.89
1	Interest from National Savings Bank		1.29
30	Interest on Bonds		28.00
575	Sale from library		
5	Members' contributions to the Harry Savory Illustrations Fund		2.25
586	Balance from last account		1,239.12
£2,622			£2,786.84

Note: These accounts do not record balances held by sectional treasurers and the Ornithological Section Special Fund of £95.80

1972 £		£ p	£ p
255	General Printing and Stationery	264.79	
220	Postages and telephone	221.35	
475			486.14
737	*Proceedings* (1972, including offprints)		1,010.75
9	Books	91.40	
49	Subscriptions for journals etc.	57.70	
	Rent (of library room)	0.05	
4	Fire insurance (library)	3.60	
			152.75
6	Contributions to Council for Nature		
	S.W.N.U. and Steep Holm Trust etc.		20.05
	Fares and expenses of general meetings		21.17
3	Field Committee: Loss		
100	Grants to Sections:		
	Botanical	10.00	
	Entomological	10.00	
	Geological	10.00	
	Mammal	25.00	
	Ornithological	40.00	
	Junior	10.00	
1,383			105.00
	Balances to next account:		
724	Cash in bank, current account 123.32 less uncleared cheque 3.60	119.72	
	Cash in bank, deposit account	346.89	
38	Deposit in National Savings Bank	39.13	
400	*£400 7% British Savings Bonds	400.00	
77	In hands of Field Committee	85.24	
			990.98
£2,622			£2,786.84

*Including the Harry Savory Illustrations Fund £59.63

P.J.M.NETHERCOTT, *Hon. Treasurer*
8 January 1974

Audited and found correct, A.E.BILLETT, *Hon. Auditor*
23 January 1974

Professor Macgregor Skene, D.Sc. F.L.S.

OBITUARIES

MACGREGOR SKENE

With the death of Emeritus Professor Macgregor Skene, D.Sc., F.L.S., on 8 August 1973, the Bristol Naturalists' Society lost one of its longest standing members and Past Presidents, and the world of botany one of its most able scholars.

Macgregor Skene was born in Aberdeen on 20 October 1889, the son of Alexander and Margaret Skene. He was educated at Robert Gordon's College, Aberdeen, and graduated at the early age of 19 from the University of Aberdeen. Subsequently he studied at the Universities of Berlin, Strasbourg and Montpellier, travelling quite widely on the continent, notably in Germany and France. Here he was much influenced by the plants and types of vegetation which he saw as well as by the botanists whom he met. In particular, he came under the influence of Professor Ludwig Jost, of the University of Strasbourg, whom he much respected. Among the plant communities which attracted his attention on the continent was the beech forest in the Cevennes, a topic on which he contributed a short article to the first volume of the *Journal of Ecology* (1913).

After holding a lectureship in Botany in the University of Aberdeen, Dr.Skene was appointed in 1925 as Senior Lecturer, and later Reader, in the Department of Botany of the University of Bristol. He served under the late Professor O.V. Darbishire, himself a prominent figure in the Bristol Naturalists' Society. In 1935, Macgregor Skene succeeded Professor Darbishire as Melville Wills Professor of Botany, a position which he held until his retirement in 1955.

It was while he was a lecturer in Plant Physiology at the University of Aberdeen that Macgregor Skene wrote his *magnum opus*, now a classic work, *The Biology of Flowering Plants*, first published in 1924. A measure of the impact and significance of this book is that it went to four impressions, the last in 1947. Professor P.W. Brian recently referred to this book (*Biologist*, 1973, Vol.20, p.186) as 'the best and most imaginative introduction to botany ever written'. Despite enormous advances in botany in recent decades, relatively little in this book is dated; rather is its style, its approach and its incisive treatment a model for present-day writers. The appealing presentation of so many important biological features of flowering plants must have attracted many to the subject.

Macgregor Skene did much to popularize botany and to present the subject clearly. Of note in this connection is his book *School Botany*, first published in 1930, and *A Flower Book for the Pocket*, a well-known Flora with colour illustrations, published in 1935. He had a great love of flowers of the hedgerows, and in later life was much attrached to the hedgerows beside the canals of the Midlands.

His research publications, although not numerous, reflect his wide interests in biology and plant physiology. Early work related to the influence of pH and calcium level on the growth of species of *Sphagnum*, while among topics covered much later was the permeability of the cullulose cell wall involving studies on discs of plant tissue.

As a teacher he had few equals. He coupled the gift of great clarity of presentation with the much rarer skill of terminating each lecture at a particularly interesting point; in this way the interest of the class was strongly held from lecture to lecture.

Professor Skene did much to develop the Department of Botany at the University of Bristol, one of the members of staff whom he was proud to attract being Lord Ashby. Professor Skene played a very large part in getting the new building for Botany and Zoology, which was completed shortly before the war, and he saw the Department of Botany grow to be a sizeable and vigorous one. After the war he took a leading part in the creation of the new Veterinary School in the University, and was Dean of the Faculty of Science from 1941-45.

He was President of the Botanical Section of the B.N.S. from 1935 for a number of years, and was a well-known speaker to that Section, especially before and during the war. As President of the Society from 1938-41, he did much to keep the Society active at that difficult time. He was elected an Honorary Member in 1966. Shortly before the war he collaborated in a survey of Steep Holm, the results of which are published in the *Proceedings* for 1938 (his contribution deals with the botany of the island, reference being made to the striking abundance of Alexanders there). An earlier paper, concerning graft hybrids, was included in the *Proceedings* for 1931.

Macgregor Skene was married in 1915 to Agnes Wallace Hamilton; their two sons, Alan and Angus, were brought up in Bristol. In later years, when visiting Alan in Orkney, he delighted in finding the endemic

Primula scotica in local abundance. Some time after the death of his wife in 1962, Professor Skene moved to Birmingham where he lived until the end of his life near to Angus and his family. He was especially proud of his seven grandchildren.

Professor Skene had wide interests which included music, county cricket, cooking (including making Rowan jelly) and gardening. In his garden at Lawrence Grove, Bristol, he grew a range of interesting plants, including many attractive species of *Geranium* and *Allium* and some unusual rock plants. He retained his enthusiasm for gardening until the end of his life, working daily in the garden less than a month before his death at the age of 83.

As a person Macgregor Skene was greatly respected for his integrity, directness, good judgment and his ability to get rapidly to the heart of a matter. For these characteristics, his erudition and his expertise as a botanist, he will long be remembered with affection by his former students, colleagues and friends.

A.J.WILLIS

F.W.EVENS

Frederick William Evens died on Dec.28, 1973 at the age of 94. He was born in Forest Gate, Essex, and went to Saffron Walden School where he already took an interest in botany. He was a lifelong member of the Society of Friends, and at the Wanstead Meeting met the sisters who had written a monograph of the Mycetozoa. From this time dates his lifelong interest in this group; his collection of more than 60 species covers the period 1896-1961.

He joined the Bristol Naturalists' Society in 1920, a year after he came to Bristol. In 1923 he became a member of Council and in 1925 gave his first lecture to the Society. He became Treasurer in 1934, at a time when a reorganisation of the basis of members' subscriptions made much extra work, and held the office until 1938. From 1941-58 he was the Society's Auditor.

In 1945 he became President of the Field Section (as it then was) and when in 1947 it became the Field Committee, he was Chairman until 1952. The President of the Botanical Section, Professor Skene could not attend meetings regularly, so Mr.Evens acted as Chairman of the Section from 1944-54. In 1948 and 1949 he was President of the Society.

From 1937-57 he led fourteen general field meetings, and fourteen field meetings for the botanical section. He also gave three lectures to the whole Society and five to the Botanical Section. His last lecture to the Section (in 1958), as his first to the Society, was on the Mycetozoa. In 1960 he was made an honorary member of the Society.

As well as the mycetozoa he was particularly interested in mosses, in seeds, and in microscopy in general. He had a collection mounted on slides of the seeds of 220 British plants.

Because of his advanced age, he had not been able to take an active part in the Society for some years, so he will not be known to many of the present members, but all older members of the Society will remember him with affection. In particular they will remember the Field Meetings when he was present, whether leading or not. He would not be content with identifying a plant, but would explain the difference between the arrangement of bee and wasp pollinated flowers or tell some interesting country legend about the plant.

A.F.DEVONSHIRE

H.H.DAVIS

By the death of H.H.Davis on January 2, 1974, the Society lost a member who had given it great service, had held its highest office and received its greatest honour.

Howard Henry Davis was born in 1898 at the family farm, Little Stoke, Patchway. After his education at Weston-super-Mare and then at Wycliffe College, Stonehouse, he remained at Little Stoke, which he farmed himself from 1931, the year of his marriage. He had been interested in bird-life since boyhood, and was already an accurate and accomplished observer. Now, with his wife's encouragement, he embarked on a broader and more serious study of ornithology. He read widely, and began to form what became a notable ornithological library. He and his wife joined the Society in 1932, as soon as they became aware of its existence. Thus started a friendship with Humphrey Tetley, Curator of Zoology at the City Museum and at that time Secretary of the Society's Ornithological Section, which had lasting results.

Howard Davis was soon active in the Ornithological Section, giving talks in 1933 on "The Birds of Little Stoke" and in 1934 on "Some interesting Waders of the Bristol District", the first two of many lectures. Encouraged by Tetley, he wrote his first paper, "Waders in the Bristol District", which appeared in the *Proceedings* for 1935. In the next year's *Proceedings*, again with Tetley's encouragement, he described a selection of his own and others' observations under the title, "Ornithological Notes, Bristol District, 1936". Thereafter the Notes appeared annually, growing after the war in scope and extent. P.J.Chadwick joined him as co-author in 1952, and in 1955 the Notes became the Bristol Bird Report, produced by a small committee on which he remained a working member for the rest of his life.

From January 1937 he was Hon. Secretary of the Ornithological Section for seventeen years. Besides the annual Notes, and occasional publications elsewhere, he wrote two more papers for the *Proceedings:* "Studies on the Biology of the Bristol Channel XV - The Severn Geese" (1943), written with H.Tetley, and "A Revised List of the Birds of the Bristol District" (1947). This latter was a major piece of scholarship, involving the synthesis of the 48 years' observations accumulated since the previous revision, as well as much deep research into the provenance of old specimens and records, which with typical thoroughness he documented in MS for his successors. Since 1947 some species have changed in status or abundance, and many new vagrants have been recorded, so the Revised List is no longer comprehensive; but it is and will remain a sure foundation for all future work.

Howard Davis became President of the Ornithological Section for a three-year term in 1954. He had been a Vice-President of the Society in 1946 and 1947, and was elected its President for 1950 and 1951 and again for 1962, the Centenary Year. He was made an Honorary Life Member in 1964. For many years he served on the Publications and Library Committee.

In 1935 he had joined the Ornithological Section of the Somerset Archaeological and Natural History Society and succeeded Tetley, on the latter's death in 1944, as a member of its Editorial Committee. He retained this office to the end of his life; he was elected a Vice-President of the Section in 1950 and made an Honorary Life Member in 1967.

He had been elected a member of the British Ornithologists' Union in 1935 and served on its Council from 1942 to 1952. He served periods too on the Councils of the Royal Society for the Protection of Birds and of the British Trust for Ornithology, and was Regional Representative of the latter for the Bristol District and for Somerset for over twenty years. These national interests, and his extensive travels in Britain and overseas in search of birds, brought him a wide circle of friends. Many eminent ornithologists stayed at Little Stoke, and incidentally lectured to the Section; but his friendship and hospitality extended also to the less eminent, and he was always ready to help or advise those who sought his aid.

One visit had a remarkable outcome. Peter Scott, who had lectured to the Ornithological Section in 1937, was invited by Howard Davis to study the geese of his beloved Severn shore. In December 1945 they found seven species present at the New Grounds, including the second and third individual Lesser Whitefronts to be recorded in Britain. In a memorial address at Almondsbury Church, Sir Peter Scott described how on that momentous day he chose Slimbridge as the ideal site for the bird organisation he had long envisaged; how a year later Howard Davis was one of five people who met at the New Grounds to set up the Wildfowl Trust, and how as Council member and later as Trustee he had served it for the next twenty-eight years.

His abundant energy enabled him to do all this while running a large and successful farm, and to do it well - for he gave of his best in all that he undertook - yet still left time for more. As a whole naturalist he was much concerned about wild life and its future. For many years he was a member of the Fauna Preservation Society, and he was a founder- and Council-member of both the Gloucestershire and the Somerset Trusts for Nature Conservation.

In 1959, when Little Stoke was scheduled for housing development, he retired to the Failand ridge, above the Gordano Valley, where he delighted in his woodland, his garden and the pleasant room built to house his books. During his years here, he became afflicted with Parkinson's Disease, a fate especially cruel to one who had been so active. He bore increasing disability with fortitude, and when he could no longer attend public meetings he continued his editorial and other committee work. In 1968, no longer able properly to tend his woods and land, he moved to Winscombe and then, in September 1973, to a new flat in Bristol, overlooking the Avon Gorge. Here, on December 16, he took part in an editorial meeting, his last formal act for the Society and for ornithology. He died suddenly, so being spared the final stages of his illness. His wife, who had made him four comfortable homes in turn and had cared for him devotedly during his invalid years, survives him with their only son.

Howard Davis will be remembered by his friends for his great knowledge, wisdom and kindness. To those who worked with him in the field or round the table, his thoroughness, absolute integrity and hatred of the slipshod set an example that will not soon be forgotten.

S.M.TAYLOR

BRISTOL BOTANY IN 1973

BY A.J. WILLIS
(Department of Botany, University of Sheffield)

The year 1973 was, overall, very close to the average as regards temperature and hours of sunshine, but was very much drier than usual. The annual rainfall was only 70.8% of the average, records from Long Ashton Research Station showing a total for the year of 653.2 mm of rain. January, February and March were distinctly dry months, but the following three months were wetter than average, and flowering times for most species were not noticeably different from normal. However, one ground frost was recorded in June. The summer was nevertheless one of generally good, warm and sunny weather, despite above average rainfall except during August which was a dry month. The year ended with very low rainfall in October, November and December, the last two months being sunny with above average temperatures.

Continuing field work, on the basis of 10 km squares for *Flora* purposes, has yielded a substantial tally of records, helping to give a more comprehensive account of the distribution of many of the less frequent species. There is clear evidence of the spread of certain species; for example, observers report the striking continued extension and increase in abundance of *Veronica filiformis*. The spread of *Impatiens glandulifera* is also still continuing, a further station is reported for *I. capensis* and several localities are recorded this year in which *Cicerbita macrophylla* has become established.

Of special interest is the discovery of some of the rarer native species in new stations. The find of *Eleocharis uniglumis* at Lawrence Weston gives a second record for v.c. 34, *Draba muralis* is reported from Lasborough, *Silene noctiflora* from near Radford, *Myriophyllum alterniflorum* from near Priddy, and *Polygonum mite* from near Wedmore. The discovery of *Epipactis leptochila* at Hursley Hill adds a second station for this rare orchid for North Somerset, and the record of *Centaurium capitatum* from Wavering Down makes a most welcome addition to the only previously known station of Crook Peak for this taxon in the Bristol region. Formerly unrecorded in the entire area is *Tilia platyphyllos*, now known to be represented by a small group of sizeable trees in an undisturbed part of Leigh Woods. Noteworthy is the general similarity of the site to localities in the Wye valley where this lime occurs. The Leigh Woods station is a most important extension of its distribution and this species a most significant addition to the flora of Somerset.

A study of the ferns in Gloucestershire in connection with new distribution maps of Pteridophyta for the *Atlas of the British Flora* has extended knowledge of the distribution of members of the *Polypodium vulgare* aggregate. *P. interjectum* was found to be widespread in Gloucestershire, appearing commoner than *P. vulgare*. Critical studies on *Bryum capillare* and its relations has resulted in taxonomic revision of this group of mosses and re-naming of some specimens from North Somerset.

With the deaths of Professor Macgregor Skene in August 1973 and of F.W. Evens in late December 1973, the Society and Botanical Section has lost two extremely long-standing members, both of whom acted as Presidents of the Society. Obituaries are given elsewhere in these *Proceedings*. Professor Skene, who occupied the Melville Wills Chair of Botany in the University of Bristol from 1935 to 1955, was President of the Botanical Section for a number of years, and a contributor to these *Proceedings*. F.W. Evens served as Chairman of the Botanical Section for a long period and took a special and very keen interest in Mycetozoa.

Names of contributors associated with several records are abbreviated thus:

J.A., Mrs. J. Appleyard
J.F.B., J.F. Burton
C.H.C., C.H. Cummins
A.F.D., Dr. A.F. Devonshire
I.F.G., Miss I.F. Gravestock
G.H., G. Hendry
P.J.M.N., P.J.M. Nethercott
R.G.B.R., Capt. R.G.B. Roe, R.N.

G: Gloucestershire
S: Somerset

Polystichum setiferum (Forsk.) Woynar Haw Wood, Hallen, G; and hedgerow, Buckland Dinham, near Frome, S, *I.F.G.*

Polypodium interjectum Shivas Bagpath Church Wall, G, *Mrs. B.M. Mack*, det. *Dr. A.C. Jermy* (an article in the *Journal of the North Gloucestershire Naturalists' Society*, Vol.24, No.2, February 1973, pp. 163-166, gives information on ferns in Gloucestershire and includes a number of new records). Also abundant in hedgerow with *Polypodium vulgare* L., Windsor Hill, Shepton Mallet, S, *I.F.G.*, det. *J.A. Crabbe*. Some notes concerning the *Polypodium vulgare* aggregate are given in *Bristol Botany in 1962*.

Aconitum napellus L. *sensu lato* By pond, Charterhouse Mineries, S, *J.A.*; like *Nymphaea alba* L., also in the pond, probably an outcast.

Ranunculus lingua L. Pond, near Hinton Charterhouse, S, *Mr. Brown*, Monkton Combe School (per *R.G.B.R.*).

Aquilegia vulgaris L. Woodland by stream between Welton and Radstock, S, *J.A.*

Thalictrum flavum L. By the River Frome, near Lullington, S, *R.G.B.R.*

Corydalis claviculata (L.) DC. Near the top of St. Stephen's Hill, near Temple Cloud, S, *P.A. Hickmott* (per *R.G.B.R.*). In *Bristol Botany in 1972* the discovery of this plant on Highbury Hill was reported and reference was made to its disappearance from St. Stephen's Hill. The present interesting find refers to the top of St. Stephen's Hill, and not to the station near to the bottom reported by White (*Flora*, pp. 138-9) and searched unsuccessfully by *R.G.B.R.*

Diplotaxis tenuifolia (L.) DC. Disused railway track near Shapwick station, S, *R.G.B.R.*

Draba muralis L. Several plants on churchyard wall, Lasborough, near Tetbury, G, where known for several decades by *Miss Huntley (Journal of the North Gloucestershire Naturalists' Society*, Vol.24, No.7, July 1973, p.227). This species is rare in District 5 of Gloucestershire.

Rorippa sylvestris (L.) Bess. Near Ladye Bay, Clevedon, S, *C.H.C.*

R. islandica (Oeder) Borbás Damp waste ground near Radstock, S, *J.A.*

R. amphibia (L.) Bess. By the River Avon near Conham Ferry, S, *R.G.B.R.* The species occurs all along the Avon to the Wiltshire border and beyond, but the present record gives the furthest downstream locality.

Arabidopsis thaliana (L.) Heynh. On ballast, disused railway line, Saltford, S, *I.F.G.*

Reseda lutea L. One plant, near Castle Hill, Clevedon, S, *C.H.C.*

Hypericum humifusum L. Several places near Priddy,S, *J.A.*

Silene noctiflora L. Neglected field, south of Radford, S, *J.A.*

Spergularia marina (L.) Griseb. Beach, Portishead, S, *I.F.G.*

Chenopodium ficifolium Sm. Mount Skitham, Hallen, G, *I.F.G.*

Tilia platyphyllos Scop. Leigh Woods, S, *P.J.M.N.* (conf. *Professor C.D. Pigott* and *L.F.H. Merton).* Five trees are growing together with *T. cordata* in an undisturbed rocky area on the slopes of the Avon Gorge. The sparse associated flora includes *Hedera helix* L., *Ligustrum vulgare* L., *Mercurialis perennis* L., *Sorbus* spp., *Corylus avellana* L. and *Dryopteris pseudomas* (Wollaston) Holub & Pouzar. The largest of the trees have boles of about 48 inches in circumference at 5 ft, and are probably more than 100 years old. The trees may very well be native and, if so, Leigh Woods is the only recorded locality in the Bristol district or Somerset where the species is indigenous. It occurs as a native in a number of woods near Chepstow and elsewhere higher up the Wye Valley.

Tilia cordata Mill. One tree, Woodhill, Portishead, S, *I.F.G.*

Malva moschata L. Roadside verge, including pink and white forms, Falfield, G, *G.H.;* also roadside verge, Wraxall, S, *J.F.B.*

M. neglecta Wallr. Near East Huntspill, S, *J.A.*

Lavatera arborea L. Four plants on imported soil, roadside verge, Tytherington, G, *K.M. Brown,* in 1972.

Geranium pyrenaicum Burm. f. Flourishing on roadside verge, Wraxall, S, *J.F.B.*

G. pusillum L. Roadside near Clevedon Court, S, *J.A.* (conf. *R.G.B.R.*).

Rhammus catharticus L. Prestow Wood, Wrington, S, *A.F.D.*

Genista tinctoria L. Plateau adjoining Haw Wood, Hallen, G, *I.F.G.* and *Mrs. M.A. Silcocks.*

Medicago arabica (L.) Huds. Lippiatt, Cheddar, S, *I.F.G.*

Trifolium striatum L. Field east of Banwell Wood, S, *J.A.*

Hippocrepis comosa L. Clandown, near Radstock, S, *J.A.*

Lathyrus sylvestris L. Railway embankment near Midsomer Norton, S, *J.A.*

Potentilla tabernaemontani Aschers. Edge of track, Prestow Wood, Wrington, S, *J.A.*

Sedum telephium L. Abundant in cutting of disused railway near Sandford Batch, S, *J.A.*

Chrysosplenium alternifolium L. Wood near Chilcompton, S, *J.A.*

Epilobium lanceolatum Seb. & Mauri Waste ground near Winford Manor, S, *J.A.*

E. roseum Schreb. By rhine, south-west of Wedmore, S, *J.A.*

Myriophyllum alterniflorum DC. Pond, north of Priddy, S, *J.A.* (conf. *R.G.B.R.*).

Viscum album L. Freshford, S, *R.G.B.R.* Although the mistletoe is stated as 'Not uncommon near Bath' in *Flora Bathoniensis* there are very few relatively recent records within a radius of 7 miles of the city, the present one being the nearest.

Oenanthe lachenalii C.C. Gmel. Bed of the abandoned Dorset and Somerset canal near Barrow Hill (near Buckland Dinham), S, *R.G.B.R.* This finding confirms the old record by Dr. H.F. Parsons given in Murray's *Flora of Somerset* (1896) but not cited by White in the *Flora of Bristol* although well within the district. Also, with *Viola palustris* L., in bog east of Heyden's Farm, near Hinton Blewett, S, *J.A.*

Polygonum bistorta L. Meadow near Priddy Pool, just north of Priddy, S, *J.A.*

P. mite Schrank Field near Yellow Batches Drove, south-west of Wedmore, S, *J.A.* (conf. *R.G.B.R.*).

Rumex pulcher L. Field near Compton Bishop, S, and abundant on Nyland Hill, S, *J.A.*

Primula vulgaris Huds. With pink flowers, near summit of Windmill Hill, near Churchill, S, *J.A.*

Anagallis tenella (L.) L. Bog east of Heyden's Farm, near Hinton Blewett, S; also at Biddlecombe, S, *J.A.*

Centaurium capitatum (Willd.) Borbás Wavering Down, S, *J.A.* (conf. *R.G.B.R.*). This is the second record for the Bristol region, the first being from Crook Peak (*Bristol Botany in 1950*). In the detailed report of the first record, it is suggested that the plant should be looked for on other dry limestone coast-hills; the present record is a most welcome indication of its wider distribution. Examination of a specimen collected on 26 August showed filaments inserted right at the base of the corolla tube, in contrast to the situation in dwarf plants referred to *C. erythraea* Rafn from Wavering Down and Compton Hill where the filaments were inserted one-half to one-third of the distance down the corolla tube (see *Bristol Botany in 1962*).

Lycopsis arvensis L. Burton Row, Brent Knoll, S, *J.A.*

Echium vulgare L. Roadside between Cheddar and Axbridge, S, *R.G.B.R.*

E. lycopsis L. Waste ground by motorway, Kingston Seymour, S; also abundant, with white, blue and purple flowers, near Clevedon Court, S, *J.A.*

Solanum dulcamara L. A form with white flowers, between Conham and Hanham, G, *P.J.M.N.*; a form with bright yellow fruits, roadside near Midsomer Norton, S, *J.A.*

Kickxia spuria (L.) Dumort. Field near Brent Knoll, S, *J.A.*

K. elatine (L.) Dumort. Fields near Radford, S; also at Brent Knoll, S, *J.A.*

Veronica agrestis L. Old rubbish-tip, Avonmouth Way, Avonmouth, G, *I.F.G.*; allotment near old railway, Wrington, S, *J.A.* (conf. *R.G.B.R.*).

Mentha x *verticillata* L. By rhine south of Mark, S, *J.A.*

M. x *smithiana* R.A. Grah. Side of ditch, Clandown Bottom, S, *J.A.*

M. x *piperita* L. By stream near Midsomer Norton, S; also wet hedge bottom, White Post, near Chilcompton, S, *J.A.*

M. longifolia (L.) Huds. Waste ground near Winford Manor, S, *J.A.*

Thymus pulegioides L. Near Kelston Park, S, and Cheddar Cliffs, S, *P.J.M.N.*; also White Hill, near Hinton Blewett, S, Hartcliff Quarry, near Winford, S, and field near Wrington, S, *J.A.*

Stachys arvensis (L.) L. Arable field near Butcombe, S, *J.A.* Although given by White (*Flora*, p.487) as common, this plant is now scarce in Somerset.

Legousia hybrida (L.) Delarb. Neglected field, south of Radford, S, *J.A.*

Galium uliginosum L. Marshy ground, with *Cirsium dissectum* (L.) Hill and *Viola palustris* L., Brinsea, south of

Congresbury, S, *J.A.*

Bidens cernua L. Pool at summit of Eaker Hill, at 950 feet, near Chewton Mendip, S, *J.A.*

Senecio viscosus L. On slag heaps at Tyning, Radstock, S, *R.G.B.R.*

S. vulgaris L. var *radiatus* Koch St. Andrew's Road, Avonmouth, and sewage farm, Lawrence Weston, G, *I.F.G.;* a few in Roper's Lane, Wrington, S, *A.F.D.*

Achillea ptarmica L. Lane near Watchfield, near Highbridge, S, *J.A.*

Serratula tinctoria L. Marshes, Lawrence Weston, G, *I.F.G.*

Cichorium intybus L. With white, blue and pink flowers, waste ground near Somerset Court, near Brent Knoll, S, *J.A.;* possibly originating from pig feed.

Potamogeton pusillus L. Rhine near Snowdrop Farm, south of Blackford, S, *J.A.* (conf. *R.G.B.R.).*

Polygonatum odoratum (Mill.) Druce Still thriving in Cheddar Gorge, S, *P.J.M.N.,* where over 200 stems were observed. It was recorded as fruiting well there in 1948 *(Bristol Botany in 1948).*

Asparagus officinalis L. Two further stations to that reported in *Bristol Botany in 1972* on the dunes, Berrow, S, *J.A.*

Iris foetidissima L. Hedgerow, Sheperdine, G, *J.D.R. Vernon* and *M.A. Wagner* (per *I.F.G.*).

Epipactis leptochila (Godfery) Godfery Under a hedge of a garden on Hursley Hill (near Pensford), S, *Mrs. G.M. Weir* (det. *R.G.B.R.,* who noted that it showed all the features of this species including the stalked anther). This plant has been reported by Mrs. Weir as having appeared for several years in succession. The present record extends the range of *E. leptochila* in North Somerset; it was reported for Cheddar Gorge in *Bristol Botany in 1957*, and seen persisting there in 1973 by Dr. J.T.H. Knight (per *R.G.B.R.*).

Spiranthes spiralis (L.) Chevall. In closely grazed limestone grassland, Hazel Down, near Alveston, G, *G.H.*; also abundant on Wavering Down, S; and Nyland Hill, S, *J.A.*

Neottia nidus-avis (L.) Rich. A small colony, Nightingale Valley, Leigh Woods, S, *Dr. P.G. Drazin.* Old records for the bird's-nest orchid are given for Leigh Woods in White's *Flora* (p. 567), and of a single plant in 1964 *(Bristol Botany in 1964).*

Wolffia arrhiza (L.) Hork. ex Wimm. Pond at Uphill, S, *Miss J.B. Webb* (per *I.F.G.*).

Eleocharis uniglumis (Link) Schult. In wet flush across a marshy, somewhat polluted field, Lawrence Weston, G, *I.F.G.* (det. *Dr. S.M. Walters*). This is the second record for v.c. 34, the first report of this plant from West Gloucestershire being from a marsh below Yate Rocks *(Bristol Botany in 1956).*

Carex lepidocarpa Tausch With *Scirpus setaceus* L., bed of abandoned canal near Barrow Hill (near Buckland Dinham), S, *R.G.B.R.*

C. strigosa Huds. Wet lane near Chewton Wood, between Litton and Farrington Gurney, S, *R.G.B.R.*; edge of ditch near Axbridge reservoir, S, *J.A.*

C. pallescens L. Field near Towerhead Brook, north of Banwell, S, *J.A.*

Carex disticha Huds. Marshy ground near Charterhouse Mineries, S, *J.A.*

C. divulsa Stokes Churchyard, Lullington, S, *I.F.G.*

Molinia caerulea (L.) Moench Damp field near Holcombe old Church, S, *R.G.B.R.* This record represents an isolated occurrence of this grass away from its main areas on Mendip which are on Old Red Sandstone.

Glyceria declinata Bréb. With *Equisetum palustre* L. and *Triglochin palustris* L., in field, Langford, S, *P.J.M.N.*

x *Festulolium loliaceum* (Huds.) P. Fourn. Field, White Post, near Chilcompton, S, *J.A.* (conf. *R.G.B.R.*).

Agropyron caninum (L.) Beauv. Meadow, Stockwood, near Bristol, S, *I.F.G.*

Elymus arenarius L. A further station to that reported last year on the Berrow dunes, S, *J.A.*

Hordeum marinum Huds. On earthen river walls by the River Yeo, Kingston Seymour, S, *P.J.M.N.*

Calamagrostis epigejos (L.) Roth By brook near East Dundry, S, *J.A.*

Gastridium ventricosum (Gouan) Schinz & Thell. Only a solitary plant noted on Clifton Down, G, *P.J.M.N.*, this grass now being very rare in the Avon Gorge.

ALIENS. Cardaria draba (L.) Desv. North of Langford, S, *J.A.*

Erysimum cheiranthoides L. Mount Skitham, Hallen, G, *I.F.G.*

Impatiens capensis Meerb. A small colony established opposite Sneyd Park, Bristol, on the left bank of the Avon, S, *P.J.M.N.* This colony is further downstream than the one noted for the 'towpath under Leigh Woods' in *Bristol Botany in 1952.*

Impatiens glandulifera Royle By the Wellow Brook at Radstock, S, *R.G.B.R.*

Medicago arborea L. Wain's Hill, Clevedon Cliffs, S, *Mrs. H.R.H. Lance* and *I.F.G.* (conf. at Kew).

Lathyrus tuberosus L. A large patch on abandoned railway track towards Newbridge, Bath, S, *P.J.M.N.*

L. latifolius L. Naturalized along disused railway, south of Brent Knoll station, S, *J.A.*

Potentilla recta L. A single plant was reported in *Bristol Botany in 1971,* but in 1973 several plants were seen over a wide area along rough ground between Conham and Hanham, G, *P.J.M.N.*

Philadelphus coronarius L. Naturalized by stream in field near Welton, near Midsomer Norton, S, *J.A.*

Bupleurum lancifolium Hornem. Attention is drawn to the characters by which *B. lancifolium* and *B. rotundifolium* L. may be distinguished in an article (*Bupleurum lancifolium* Hornem. and *B. rotundifolium* L. (Umbelliferae) in Bristol and elsewhere) by Dr. T.E.T. Bond in these *Proceedings* for 1972 (Vol. 32, Part 3, pp. 285-90). The specimen reported in *Bristol Botany for 1970* (p. 16) as *B. rotundifolia* from Beryl, Wells, S, has been re-examined by *R.G.B.R.* and found to be *B. lancifolium.* The latter species has also been reported (per *R.G.B.R.*) from gardens at Charlcombe, S (1965) and Nettlebridge, S (1972), both clearly being 'bird-seed' occurrences.

Heracleum mantegazzianum Somm. & Levier By stream in small combe near the Vicarage, Weare, S; *J.A.*

Polygonum baldschuanicum Regel On trees, near Ladye Bay, Clevedon, S, *C.H.C.*

Symphytum x *uplandicum* Nyman Abundant in Priddy Churchyard and spreading to adjacent fields, S, *J.A.*

Datura stramonium L. In the grounds of Pucklechurch School, G, *H.J. Hewitt* (per *A.F.D.*).

Verbascum phlomoides L. Banks of new road-works at Beckington and near Spring Gardens, north of Frome, S, *R.G.B.R.*

Cymbalaria muralis Gaertn., Mey. & Scherb. With white flowers, wall at Bloomfield, near Timsbury, S, *J.A.*

Mimulus guttatus DC. By the Wellow Brook near Stony Littleton, S, *R.G.B.R.*

Mentha spicata L. Behind chapel, Mark Causeway, S; also waste ground, White Post, near Chilcompton, S, *J.A.*

Senecio fluviatilis Wallr. A small patch by the Avon below Hanham, S, *R.G.B.R.* Also banks of Cam Brook, Radford, S, *J.A.*

Cicerbita macrophylla (Willd.) Wallr. Well established clump, roadside verge, Westonbirt, G, *Mrs. T. Ridout,* in 1972; lane, Stoke Bishop, Bristol, G, *I.F.G.;* a patch of several square yards established on Clifton Down, Bristol, G, *P.J.M.N.*

Lolium multiflorum Lam. f. *ramosum* (Guss.) P. Junge Waste heap, Nyland, S, *J.A.*

Setaria viridis (L.) Beauv. Near Somerset Court, Brent

Knoll, S, *J.A.*

BRYOPHYTES. *Cephaloziella hampeana* (Nees) Schiffn. On live *Salix cinerea* L., 6 ft above ground level, Eaker Wood, near Chewton Mendip, S, *J.A.* This is an unusual situation for this liverwort, normally found on raw humus or soil.

Physcomitrella patens (Hedw.) B., S. & G. Muddy field near Brent Knoll, S, *J.A.*

Bryum capillare Hedw. var. *rufifolium* (Dix.) Podp. Crevice of wall, West Horrington, S, *J.A.*, c. fr. 1967 (as *B. obconicum*). This record is given by Hadiuzzaman Syed in an article entitled 'A taxonomic study of *Bryum capillare* Hedw. and related species' in *J. Bryol.* 1973, Vol. 7, pp. 265-326. *Bryum capillare* Hedw. var. *capillare* is common and widespread in the Bristol area; Syed's paper confirms *Bryum torquescens* Bruch, now given specific rank, from rocky ground, Swallow Cliff (Sand Point), S, *J.A.*, 1961, as in 'A Bryophyte Flora of North Somerset' (*Trans. Br. bryol. Soc.* 1970, Vol. 6, p. 29).

Drepanocladus revolvens (Turn.) Warnst. var. *intermedius* (Lind.) Rich. & Wall. Bog near Hinton Blewett, S, *J.A.* The second record for v.c. 6.

I am indebted to all those who have supplied records and helped with these, especially Mrs. J. Appleyard, Miss I.F. Gravestock, Mrs. S.C. Holland, Mr. P.J.M. Nethercott and Captain R.G.B. Roe; I am also grateful to Mr. M.W. Huxley of Long Ashton Research Station for the supply of meteorological data.

LEPIDOPTERA NOTES

BRISTOL DISTRICT, 1973

BUTTERFLIES

By A. N. GROSE

A good year, except that May was rather cool and July rather dull and rainy at times. The blues and hairstreaks apparently suffered from last year's weather, but the butterflies with grass-feeding caterpillars were generally common, as were Small Tortoiseshells and Peacocks. The former were in great abundance during the late summer. Lack of records of some species may be due to poor observer cover.

Contributors: R.Angles, G.R.Best, J.F.Burton, P.J.Chadwick, R.M.Curber, Miss I.F. Gravestock, B.J.Gregory, A.N.Grose, D.R.Hamblett, B.S.Harper, M.Heath, C.Jordan, T.B.Silcocks and H.STacey.

The initials G and S refer to the Watsonian vice-counties of West Glos. and North Somerset respectively.

Pararge aegeria (Speckled Wood)
Widespread and particularly common, late June and July. Kingsweston Down: 45, July 13; Dolebury Warren, June 16; Lower Hazel Down: one, June 29.

Pararge megera (Wall Brown)
Seen in small numbers; fairly common in some S localities. Cadbury Camp: 17, Aug.12; Saltford: 12 on Aug.11.

Melanargia galathea (Marbled White)
Fairly common in the usual localities, especially Nailsworth, July 4; Kingsweston Down (abundant, July 8 and 27); Brockley Combe (103, July 8); Goblin Combe (33, July 25) and Brent Knoll (abundant, July 26). A female variant with dark brown markings on hind wings, Church Hill, Clevedon, July 7.

Eumenis semele (Grayling)
Few records. Several, Bream, July 10 and Goblin Combe on 25th.

Maniola jurtina (Meadow Brown)
Widespread and common; a good year, particularly at Goblin Combe (235, July 28) and Kingsweston Down. Common, Charterhouse and Brent Knoll.

Maniola tithonus (Hedge Brown)
Fairly common, Kingsweston Down (66, July 31), Bledisloe, Blakeney (several, Aug.12) and Cadbury Camp (90, Aug.12).

Coenonympha pamphilus (Small Heath)
Widespread and common. Bream: 3, May 22; Dolebury Warren: 29, June 16; Charterhouse: common, July 1.

Aphantopus hyperanthus (Ringlet)
Common in most suitable localities.
Leigh Woods: 24, July 7; Brockley Combe: 179 on 8th.

Argynnis selene (Small Pearl Bordered Fritillary)
G. No records.
S. Brockley Combe: 17, June 14; Dolebury Warren: 27 on 16th.

Argynnis euphrosyne (Pearl Bordered Fritillary)
G. A few, Dymock Woods, May 14; two, Bream, on 22nd.
S. No records.

Argynnis aglaia (Dark Green Fritillary)
G. One, Filton, June 15.
S. Six, Charterhouse, July 1; five, Brockley Combe on 8th; 12, Goblin Combe, on 25th. Several at Upper Langford and Dolebury.

Argynnis paphia (Silver Washed Fritillary)
G. Ten, Blackpool Bridge, Forest of Dean, July 19.
S. Brockley Combe: 7, July 8; Saltford: one, Aug.11.

Euphydryas aurinia (Marsh Fritillary)
G. No records.
S. One, Charterhouse, June 10.

Vanessa atalanta (Red Admiral)
Fairly common and widespread; a good year. Henleaze, Bristol: fairly common, Aug., Sept., on rotten apples, 8 pupae on Sept.13. Brockley Combe: two, July 8; Leigh Woods: two, Sept.8.

Vanessa cardui (Painted Lady)
Widespread but uncommon.
Upper Langford: one, July 14; Brean Down: two, Sept.2.

Aglaise urticae (Small Tortoiseshell)
Abundant everywhere.
Adults and larvae, Rockhampton, July 7; Blagdon: over 250 on Catmint, Aug.18, and 150 on 25th. Kingsweston Down: 40, Sept.18.

Nymphalis io (Peacock)
Widespread and common, particularly in late summer.
Cadbury Camp: 58, Aug.12; five, Blagdon on 25th.

Polygonia C-album (Comma)
Widespread but not common. Inglestone Common: one, Sept.4. Wick; one, Mar.19 and six on 23rd. Saltford: seven, Aug.11.

Limenitis camilla (White Admiral)
G. Small numbers, not a good year. Several, Dymock Woods, July 31.
S. No records.

Cupido minimus (Small Blue)
No records, G or S.

Aricia agestis (Brown Argus)
G. Several, Stinchcombe Hill, Aug.20.
S. Goblin Combe: ten, May 26; 15, Aug.26. Dolebury Warren: two, June 16.

Polyommatus icarus (Common Blue)
Widespread but numbers down. Stinchcombe: a few, Aug.20. Goblin Combe: 19, May 26 and 25, Aug.26. Four, Inglestone Common, September.

Celastrina argiolus (Holly Blue)
A poor year with few records.
G. One, Wick, Apr.27; two, Kingsweston Down, July 31.
S. No records.

Lysandra coridon (Chalkhill Blue)
G. Many, Stinchcombe Hill, Aug.20; 13, Rodborough Common, Aug.9.
S. No records.

MOTHS

By K.H.POOLE

The following list has been compiled from records contributed by C.S.H.Blathwayt (CSHB), J.F.Burton (JFB), K.H.Poole (KHP), T.B.Silcocks (TBS) and J.D.R.Vernon (JDRV). Unless marked * all were noted at light, and were single specimens unless shown otherwise.

Acherontia atropos L. (Death's-head Hawkmoth) (♀), Clevedon, October 21* (Mrs.N.Neath, per JFB).

Herse convolvuli L. (Convolvulus Hawkmoth), larva, Thornbury, (R.Leeson, per JDRV).

Drymonia ruficornis Hufn. (Lunar Marbled Brown), Milton, Weston-s-Mare, May 20 (KHP).

Pseudoips bicolorana Fuess (Scarce Green Silver-lines), Weston-s-Mare, July, a few (CSHB).

Eilema complana L. (Scarce Footman), Clevedon, July 24 (2) (JFB).

Lycophotia porphyrea Schiff. (True Lover's Knot), Abbots Leigh, July 2 (TBS).

Agrotis ripae Hubn. (Sand Dart), Weston-s-Mare, July 7*; Berrow, July 13*, fairly common (CSHB).

Xylophasia sublustris Esp. (Reddish Light Arches), Milton, Weston-s-Mare, July 5 (KHP).

Apamea scolopacina Esp. (Slender Brindle), Weston-s-Mare, July 30 (CSHB); Abbots Leigh, Aug.17, 18 (TBS).

A. ophiogramma Esp. (Double Lobed), Shapwick, June 29* and July 6* (CSHB).

Celaena leucostigma Hubn. (Crescent), Shapwick, August 17 (CSHB).

Leucania straminea Treits. (Southern Wainscot), Berrow, July 13* (CSHB).

Eurois occulta L. (Great Brocade), Weston-s-Mare, Aug.1, pale specimen (CSHB).

Charaeas graminis L. (Antler), Abbots Leigh, July 29 (TBS).

Zenobia retusa L. (Double Kidney), Shapwick, August 3 (CSHB).

Z. subtusa Schiff. (Olive), Milton, Weston-s-Mare, July 30 (KHP).

Dasycampa rubiginea Schiff. (Dotted Chestnut), Weston-s-Mare, Nov.6* (CSHB).

Jaspidea pygarga Hufn. (Marbled White-spot), Shapwick, June 22 (CSHB).

Plusia gamma L. (Silver Y), Clevedon, Weston-s-Mare, many during August and September*, (JFB, KHP).

Ophiusa pastinum Treits. (Blackneck), Milton, Weston-s-Mare, July 5 (KHP).

Tholomiges tufosalis Wocke (Marsh Oblique Barred), Shapwick, Aug.10 and 17 (CSHB).

Scopula marginepunctata Goeze (Mullein Wave), Milton, Weston-s-Mare, June 22 (KHP).

Lampropteryx otregiata Metc. (Metcalfe's Carpet), Shapwick, May 55, June 8, 16 and August 17 (CSHB).

Eupithecia denotata Hubn. (Campanula Pug), Weston-s-Mare, June 24 (CSHB).

E. pygmaeata Hubn. (Marsh Pug), Shapwick, May 28* (CSHB).

E. valerianata Hubn. (Valerian Pug), Shapwick, July 6 (CSHB).

Erannis marginaria Fab. (Dotted Border), Clevedon, March 4, with uniform brown forewings (JFB).

Ectropis extersaria Hubn. (Brindled White Spot), Weston-s-Mare, early June, several (CSHB).

The following list, all from Bristol, on shop windows, street lights, etc. (P.M.Heath), shows what can be observed by the keen-eyed within the city itself.

Agrotis puta Hubn. (Shuttle-shaped Dart),
Amathes xanthographa Schiff. (Square-spot Rustic),
Triphaena pronuba L. (Large Yellow Underwing),
Diataraxia oleracea L. (Bright-line Brown-eye),
Phlogophora meticulosa L. (Angle-shades).
Aparmea monoglypha Hufn. (Dark Arches),
A. secalis L. (Common Rustic),
Agrochola lychnitis Schniff. (Beaded Chestnut),
Plusia gamma L. (Silver Y),
Dysstroma truncata Hufn. (Common Marbled Carpet),
Abraxas grossulariata L. (Magpie),
Deuteronomos fuscantaria Haw. (Dusky Thorn),
Colotois pennaria L. (Feathered Thorn).

BRISTOL BIRD REPORT, 1973

COMPILED BY THE EDITORIAL COMMITTEE OF THE
B.N.S. ORNITHOLOGICAL SECTION

P. J. CHADWICK G. E. CLOTHIER
H. H. DAVIS H. R. HAMMACOTT
S. M. TAYLOR G. SWEET
J. D. R. VERNON

This thirty-eighth annual report can be said, for two reasons, to mark the end of an era. It is the last to bear the name of our senior Editor, H. H. Davis, who began the series in 1936 and whose death on Jan.2, 1974, is reported elsewhere in this volume. It is also the last to be produced before the new County boundaries come into effect. These will inevitably have some effect on reporting procedures, although details remain to be worked out. We can say, however, that although the legal validity of the new boundaries dates only from April 1, 1974 the whole of that year's report will be made on the new basis.

THE YEAR. 1973 was warm and exceptionally dry. In the first quarter, precipitation was only 45%, and in the last quarter only 42%, of normal and for the whole year's total, the figure was 70%.

The first half of January was dominated by anticyclones which held up the Atlantic fronts; weather was mild, and winds light, with fog at times. Then came unsettled weather, with S.W. winds sometimes of gale force. Rain on the 20th turned to snow, but by the 23rd the temperature was again above the $10^{O}C$ ($50^{O}F$) level. At the New Grounds, the bulk of the Bewick's Swans left by Jan.12, earlier than ever before, and some colour-marked birds were seen on the R. Elbe by the 18th. Several Little Stints were present in the area, confirming the growing tendency of this species to winter in Britain. No large-scale weather movements of bird flocks were reported.

February was mild and relatively dry, except for cold spells from the 12th-16th, with sleet and snow, and from the 26th, when snow once more covered high ground. A report of a Bittern at Litton reservoir on the 25th appeared in *British Birds*, but this record has not reached us. However, the bird at Chew Valley Lake in late 1972 was seen at intervals until March.

The first week of March was rainy, but the next fortnight was dry and warm with light, generally easterly winds, though nights were rather cool. In the last week conditions were less settled, but temperatures were above average. A Wheatear on the 7th at Sand Bay was the year's first to be reported to *British Birds*, a day earlier than 1972's first and in the same place. A Reed Warbler at Chew on the 24th was very early - some three weeks before the first appreciable fall of the species.

April started with rain and S.W. gales, but in the main winds during the month were from the N. or N.E. with occasional snow flurries (heavy snow fell in the Midlands and North on the 9th.) Warm but rainy weather arrived from the S.W. on the 26th. Wood Warblers were late; the first two reported to *British Birds* were at Weston Bay on the 17th and Portbury Wharf on the 26th. A fall of twelve or more Wheatears at the New Grounds on April 24 suggested, by their large size and bright colouring, that they belonged to the Greenland race. In the next two days, parties of 50-60 of this race were seen in S.W. Lancs. and on the Calf of Man.

May's weather was unsettled, with S.W. gales on the 4th and 5th, then showery thundery weather, with blustering S.W. winds as a succession of low pressure systems crossed the country. Winds were easterly during a fine spell from the 14th-16th, and the 26th and 27th were warm and sunny. The S.W. winds brought records of Fulmars, Manx Shearwaters and skuas in the Estuary. Only a few southern herons were seen in the country, and one of these was a Squacco Heron at Chew, the first known in our area since one was shot at the New Grounds in 1867. A Hoopoe was seen at Sand Bay on the 16th. From the 20th, an influx of Red-footed Falcons occurred from southern Europe, involving perhaps 20 birds. One was present just north of our area, at Kenfig Burrows in Monmouthshire, from the 20th-30th, and on the 25th one visited the New Grounds.

From the start of June the weather was warm and sunny (except for two thundery outbreaks in the third and fourth weeks) until July 10, when it became much cooler and unsettled, with heavy rain and strong S.W. winds at times. The warm and sunny weather returned for the last week of July. A number of Spoonbills were reported in the country in June, including several along the northern shore of the Estuary, and from June 10-27th one stayed at the New Grounds. A Short-toed Lark at Brean Down on June 16th was the first ever recorded in Somerset.

August started wet, with more strong S.W. winds, but was hot and sunny from the 11th-19th, then cloudy though still warm. Unsettled weather continued for the first week of September, but an anticyclone then brought more fine weather, with light, variable winds and some fog. From the 18th, rainy weather moved in from the S.W. and the rest of the month was cooler and showery, though winds were light and variable. Thirteen widely-spaced records of Temminck's Stints in England included one at Chew on Aug.28th.

On Sept.24th a Red-throated Pipit was seen at Blagdon reservoir, another first record for Somerset. On the 26th a Spotted Crake, one of several in the country, appeared at Chew Valley reservoir, and a Sabine's Gull arrived next day; others were seen at eight or so localities throughout the country. On the 29th a second Spoonbill appeared, also at Chew, and a Grey Phalarope at Weston Bay.

The autumn was a good one for records of North American waders. Pectoral Sandpipers were seen at 22 localities in Britain, including Chew Valley reservoir, but pride of place locally goes to a Buff-breasted Sandpiper at Blagdon. This was the third Somerset record, the others being at Steart in 1966 and Cheddar reservoir in 1970; it was also the third record for our area, being preceded by the Cheddar bird and one at the New Grounds in 1961.

The autumn passage of Little Stints was exceptional in the western half of the country, and some of the largest counts were at Blagdon and Chew Valley reservoirs. In late September, Curlew Sandpipers were also more numerous than usual, with up to ten at Blagdon and seven at Chew Valley.

As the year progressed, the reservoirs became increasingly depleted, with very large areas of exposed mud. As a result, large flocks of some waders built up, with over 200 Snipe and 1,000 Dunlin at Chew; less common species - Greenshank and Common Sandpiper, for example - also occurred in larger numbers and for longer periods than usual.

The first half of October was anticyclonic, resulting in dull weather with occasional drizzle and fog. Easterly winds predominated, light on the whole but fresh during a rain outbreak on the 12th and 13th. A second Sabine's Gull appeared in the area on the 3rd, with a second Grey Phalarope the same day. A heavy passage of Redwings was seen on the 12th over the New Grounds, continuing all day and extending into the 13th; oddly enough, the birds were moving northwards. The first Bewick's Swans of the autumn arrived at the New Grounds on Oct.13 - the earliest return date recorded. The autumn flock contained 28% young birds, indicating a good breeding season in the Arctic. The first White-fronted Geese had also arrived very early (on Sept.27) and the autumn flock contained 39% young birds, a very high figure for the second successive season.

On Oct.23 the Azores 'high' extended over Britain, giving mild, cloudy but dry conditions. Fog developed in the last days of the month and the first week of November, then unsettled conditions prevailed with S.W. gales on the 12th and 13th. From the 17th it became colder, with rainy periods interspersed with cold N.W. winds. These lasted into the first days of

December, but the rest of the month was cloudy and fairly mild in the S.W. of the country. The year ended with gales in the Atlantic. Many Long-tailed Ducks occurred on inland waters elsewhere during November, but it was Dec.26 before one appeared at Chew Valley reservoir. However, the number of Goosanders there built up throughout December to a peak of 62, the highest ever recorded in the area. Very large totals were present also in Middlesex, Leicestershire and Derbyshire. Little Stints and Curlew Sandpipers were seen at Chew up to the end of the year, presumably over-wintering birds.

COMMON BIRDS. Long-tailed Tits and Goldcrests, both delicate species and vulnerable in cold winters, have become increasingly plentiful after yet another season with no very severe or prolonged cold weather. Goldcrests have often been reported from deciduous trees as well as from their more usual coniferous habitats. A pair of Reed Warblers nested on Nailsea Moor, the first recorded in eighteen years of close study (HRH); Sedge Warblers breed there regularly.

Whitethroats continued to be well below their pre-1968 level; they were very scarce or absent altogether in parts of the area, but appeared to be making a slow recovery in others. Spotted Flycatchers too remained fewer than formerly, but their numbers were higher in 1973 than in 1972.

Of larger birds, there was an encouraging increase in sightings of Barn Owls, but all related to single birds. The status of the Cuckoo remains unclear; some observers consider that fewer than ever were present in 1973, but too few reports were received for a satisfactory assessment. Many more reports, positive or negative, would be welcome.

URBAN BREEDING OF GULLS. The records of Herring and Lesser Black-backed Gulls breeding on roof-tops in Bristol have increased in 1973, and a first report has come from Bath. In both cities, the numbers of gulls seen on or over roofs which cannot be examined suggests that there may have been many nests not recorded.

NORTH SOMERSET ROOKERIES. In April 1973, members made a survey and census of the rookeries lying in the North Somerset part of our area. A total of 185 rookeries, containing in all 3443 nests, was found. This figure represented a reduction of almost 40% since the census made by B.W.Tucker in 1933. At that date the area held fourteen rookeries with over eighty nests, while in 1973 there were only two.

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The initials G and S denote the parts of the district in South Glos. and North Somerset respectively, defined as follows.

That part of Glos. lying east of the Severn and bounded on the N. by the R. Frome from its mouth at Arlingham Bend inland as far as Dudbridge, then by its tributary S. to Avening, and then by the A434 road through Tetbury to the Wilts. border; and that part of Somerset bounded on the S. by the R. Axe from its mouth to Wookey, and then by the B3139, A371 and B3098 roads through Wells, Shepton Mallet and Frome to the Wiltshire border. Brean Down, Steep Holm and The Denny are deemed to lie within the area. From its mouth inland to Swineford, the centre-line of the R. Avon is taken as a conventional boundary between G and S; otherwise the political boundary applies.

The systematic list following is in the order, and follows the nomenclature, of *A Species List of British and Irish Birds*, published by the British Trust for Ornithology at the request of the 1971 Conference of Report Editors.

GREAT CRESTED GREBE *Podiceps cristatus*

S. Total less than 100 early in the year. Numbers at Chew Valley reservoir reached 150 by mid-June, 250 by end of July, 350 in September and 400 in October/early November, decreasing to 250, mid-November to December. The only breeding record was of a pair with three juveniles at Litton resr.

BLACK-NECKED GREBE *Podiceps nigricollis*

S. Four records, all from reservoirs: single birds at Blagdon, March 22, at Chew Valley, April 1-3 and at Cheddar, July 29 - Aug.4; and two at Blagdon on Sept.16.

FULMAR *Fulmarus glacialis*

S. One found dead at Brean Down, Feb.17 (RA). Noted in the Estuary from April to September, including 17 off Brean Down, April 1; 15 on May 24 and nine, June 10; four off Sand Point on May 1 and five on June 13.

MANX SHEARWATER *Puffinus puffinus*

S. One was found at Frome, Oct.21 (CC). All other records were from Sand Point and Brean Down, on 17 dates, May to August. Main numbers at Brean were 200, June 10; 100 on 19th and 183 on July 20; and at Sand Point were 14, May 10; 21 on 31st; 97, June 10 and 62 on 13th, 15 on 20th and 24 on 30th; 11, July 21 and 44 on Aug.4 (RA, TB).

STORM PETREL *Hydrobates pelagicus*

S. Four were noted off Sand Point on Aug.7 (TB).

GANNET *Sula bassana*

Noted in the Estuary on only 16 days (cf. 34 in 1972). Usually only one or two birds were seen, but eight were off Brean Down on July 8 and four on 20th; and ten off Sand Point on Aug.7.

CORMORANT *Phalacrocorax carbo*

The largest coastal counts were 21 at Brean Down on April 5; five at Portbury, April 8; and six at Severn Beach on Sept.11. The island roost at Chew Valley reservoir held up to 55 birds in January and February; and increased from five in mid-September to some 50 in December. Up to three were noted at Blagdon reservoir in spring and autumn, one at Barrow Gurney on Oct.21 and 16 at Cheddar, Dec.29. The breeding colony on Steep Holm (whose birds often visit Cheddar) held 40 birds on June 30.

SHAG *Phalacrocorax aristotelis*

S. Two adults and a juvenile were present at Chew Valley reservoir on Aug.7; the juvenile was still present next day (BLK).

HERON *Ardea cinerea*

Counts were received from all known heronries; the total of occupied nests was about the same as in 1971 (78/80 cf. 78/79).

SQUACCO HERON *Ardeola ralloides*

S. One was seen at Chew Valley reservoir on May 26 (AB *et al.*); the record, accepted by British Birds Rarities Committee, is the second for our area.

BITTERN *Botaurus stellaris*

S. Single birds, Chew Valley res., Jan. - Mar.18 and Nov.25 to end year.

SPOONBILL *Platalea leucorodia*

G. An immature bird was present at the New Grounds, June 10-27 (LPA).

S. An immature bird stayed at Chew Valley reservoir, Sept.29 - Oct.10 (JB, RAH, DS *et al.*) and an adult was seen at Emborough, Oct.7 (RSH).

MALLARD *Anas platyrhynchos*

Common and widespread as a breeding species. Eggs and/or young reported from 17 localities including Cromhall, Eastville and Centre of Bristol, Abbot's Pool (Failand), Wraxall, the reservoirs and the moors. Some 1,600 at the New Grounds, Jan.12; over 1,600 in N. Somerset, mid-January, 1,400 in late September and about 1,700 in mid-November.

TEAL *Anas crecca*

G. Maximum counts were 720 at New Grounds on Sept.21 and 150 at Frampton Pools on December 1st.

S. About 500 in the area in January and 600 in February. There was an early return in autumn, with 250 at Blagdon in mid-August and 560 on Sept. 2nd. The area total increased to 1,100 by November and 1,300 in December.

GARGANEY *Anas querquedula*

G. Three, Frampton Pools, April 9; a male, New Grounds, Aug.7 and 21st.

S. A male, Kennet and Avon Canal, March 9 (EJL). A pair, Chew Valley res., April 23; up to eight in June; four or five, mid-July to August (9, Aug. 4 - RMC) and one or two to Sept.22. One at Portbury Wharf, Aug.26-28.

GADWALL *Anas strepera*

G. Up to 38 at Frampton Pools in Spring; two pairs bred; up to 100 there, September to December. One, Tortworth Park Lake, March 25.

S. Bred at Blagdon, Chew Valley and Litton reservoirs. In autumn, some 140 were in the area; initially most were at Chew Valley reservoir, but the main flock moved to Cheddar res. in October. Up to four birds were occasionally noted at Barrow reservoirs, Orchardleigh Lake, Emborough Pond and the coast at Portbury Wharf.

WIGEON *Anas penelope*

G. Highest count at New Grounds was 2,300 on Jan.12 (MAO); 500-600 there, Feb.3. Up to 55 present, Severn Beach - Chittening area, January to February and up to 24 in December.

S. Some 1,000 in the area in January, decreasing to 700 in March and 100, early April. One stayed at Chew Valley res. from May to July. The first Autumn records were of three at Portbury, Aug.18-19 and one at Cheddar reservoir on 23rd. In September numbers rose slowly, with an influx in October (300 at Cheddar on 4th). Area total was about 1,350 by end year.

PINTAIL *Anas acuta*

G. Maximum count in New Grounds area was 250-300, January-February.

S. Few present early in the year, but more than usual in autumn (when the first seen were two at Sand Point, July 31 - TB). Reservoir counts - Cheddar: 25, Oct.21; 66, Nov.4, then up to 35 to end of year; Blagdon: 17, Oct.27; 19, Nov.14; and 23, Dec.15; up to nine at Chew Valley.

SHOVELER *Spatula clypeata*

G. Some 200 in the New Grounds area, Jan.-Feb. and November-December.

S. Fewer than 150 present in January, but over 220, mid-Feb. and March. Bred at reservoirs (two broods at Blagdon and one at Chew Valley). Up to seven at Portbury Wharf, mid-July to August (usually only ones and twos are seen on coast). Some 400-500 were in area in September; main flock was usually at Chew Valley res. (where 427 counted in mid-Dec. and 600-650 later in month); up to 33 at Cheddar and four or five, Barrow and Blagdon.

RED-CRESTED POCHARD *Netta rufina*

S. Cheddar reservoir: a male in January, then a pair, Feb.7-19; a female, Sept.14; a male, Oct.21-Dec.9 then two, Dec.15-21 (JB, SBE, RCJ *et al.*). A juvenile, Chew Valley res., Aug.30-Sept.1 (CVRS).

SCAUP *Aythya marila*

G. Frampton Pools: single females present, March 9 - April 9, July 13 and Sept.21; a second bird was present, March 29-30 (TDE).

S. Most reservoir records were from Cheddar: one, in January; a pair in February; 11 from mid-March to end of April; 7 to May 2 and a pair to 14th; a female, Oct.3-9 and Nov.8-12, and up to three in December (SBE, RCJ, HRHL *et al.*). Barrow Gurney: a female, Jan.28 - Feb.22 and a pair on May 5 (AM). Chew Valley: a male, Jan.21; up to three, end of March to April 15 and one male, April 23 - May 9 (CVRS, RSH). Only coastal record was of a female in the Axe Estuary on Oct.9 - possibly the bird from Cheddar.

TUFTED DUCK *Aythya fuligula*

G. At Frampton Pools numbers varied between 225, Jan.4 and 117, Feb.19; eight pairs bred; 66 present, Sept.21 and up to 250 in November-December. In Bristol, occasionally in City Docks; eight, St.George's Park, Dec.24.

S. Some 500 in the area to end of February, and 625 by mid-April. Bred at reservoirs (Blagdon, 1 pair; Chew Valley, 3 pairs cf. 50 in 1972; Litton, 3 pairs), and at Newton Park Lake (1 pair). Over 400 in area, August and September and 550, October to December. Occasionally seen at Portbury Wharf.

RING-NECKED DUCK *Aythya collaris*

S. A single male was present at Blagdon reservoir, March 16 - April 16 (KTS *et al.*) and again at Cheddar reservoir from Sept.10 - Oct.4 (MGW).

POCHARD *Aythya ferina*

G. Up to 250 at Frampton Pools, Jan. - Feb., most leaving early March - 25 present on 29th; nine, mid-Sept., up to 130 in Nov. and 220 in December.

S. Area total 600-650, January; 500+ in February; then up to 100, rising to 280 early July and to 600 in mid-September, 750 by end of month and 800-850, November to December. Only one brood seen, at Chew Valley reservoir.

GOLDENEYE *Bucephala clangula*

G. Frampton Pools: six in January; up to seven, February to March; three, April 9; three in November and December.

S. Numbers similar to those in 1972; counts of 55-68, January to middle of February, 50 in mid-March and 40-45 in April; one on May 1. First autumn arrivals on Oct.13; 25-30 present, mid-Nov. and 35 by end year.

LONG-TAILED DUCK *Clangula hyemalis*

S. The female present at Barrow Gurney resrs. at end of 1972 stayed until May 5; another was at Chew Valley reservoir, Dec.26-31 (HRHL, AM *et al.*).

VELVET SCOTER *Melanitta fusca*

S. Adult male off Sand Point, Oct.26, 1969 - record just received (BLK).

COMMON SCOTER *Melanitta nigra*

S. Noted off Weston-s-Mare on 26 dates, January to October. Counts totalled 98 birds, of which 30 were in April (11 off Brean Down on 13th and 6 on 29th), 17 in May, 16 in August and 13 in September. Reservoirs: one each at Barrow, May 5; Chew, July 20 and Cheddar, Aug.6; and five at latter, Oct. 2nd.

EIDER *Somateria mollissima*

S. The flock of 11 present off Brean Down in Dec. 1972 had left by Jan.1. Reported off coast each month, Jan. to September: up to three off Sand Point in Jan., one in Feb., one, July 29 - Sept.16; four to S.W. off Birnbeck I., May 6; five off Brean Down, Mar.16, six, on April 13; eleven from April 15 to May 5, then one or two males to July 14.

RUDDY DUCK *Oxyura jamaicensis*

G. Frampton Pools: a pair was seen on April 14.

S. Four pairs bred at Chew Valley reservoir. Out of breeding season, most birds usually at Blagdon, where up to 70, February and nearly 100 at end of year. Single males, Barrow Gurney resrs., Mar.11 and Dec.2 (AM); a female, Cheddar res., Oct.13/14 and two males on Dec.2 (RCJ *et al.*).

RED-BREASTED MERGANSER *Mergus serrator*

G. A male was present on the estuary off the New Grounds, Dec.10 (LPA).
S. Reservoirs: one, female or immature, Cheddar, Nov.10-17; a male at Blagdon, Nov.14 and another, Chew Valley, Dec.18. A pair, off Sand Point on Nov.22, was the only coastal record. (TB, RSH, AM *et al.*).

GOOSANDER *Mergus merganser*

G. Frampton Pools: a 'redhead', Dec.2-18 and three from 23rd (LPA, RKB).
S. All records from reservoirs. Two at Blagdon, Feb.11; all other winter and spring records from Chew Valley, where up to 15 present, January; nine for most of February, but 14 (7 males) on 16th and 16 (6 males) on 18th; six, March 8, three on 17th, two on April 29 and one, May 20 (CVRS *et al.*). Autumn: two, Chew Valley, Nov.2-10; three on 17th and four next day; 33, Dec.9 increasing to 50 on 15th and 62 on 17th; 45, Dec.21 and 55 on 23rd; five at Cheddar, Nov.18 and up to four, December. (RMC, SBE, RCJ *et al.*).

SMEW *Mergus albellus*

G. Two 'redheads', Frampton Pools, Dec.1-4 (LPA, NR) and a pair from Dec.5 to 16th (TDE, NR *et al.*).
S. One male bird, usually at Cheddar reservoir but sometimes at Blagdon or Chew Valley (almost certainly same bird), January to April 8; a female, Cheddar reservoir, Nov.10-12 and Dec.22; two females, Nov.18 and Dec.8; and one male, Nov.25 to end of year (JB, RMC, HRHL *et al.*).

SHELDUCK *Tadorna tadorna*

Coastal survey in breeding season: best estimates for (a) New Grounds to R. Avon and (b) R. Avon to Birnbeck Island as follows. May population: (a) 150; (b) 140. Total pulli reaching coast: (a) 50 and (b) 145. The former are 30% below, and the latter 30% above, the 1972 estimates.

A pair hatched eight pulli at Chew Valley reservoir, and reared five or six. More birds than usual at reservoirs in December: 4 at Barrow, 2 at Blagdon; 11 at Cheddar and 27, Chew Valley.

GEESE *Anser* sp.

Four over Filton (with a Bar-headed Goose!), March 16; nine to S.W. at Bleadon, Sept.1 and three, Middle Hope, on 12th (RA, TB).

WHITE-FRONTED GOOSE *Anser albifrons*

G. The New Grounds total of 2,000 at end of 1972 rose to 6,000 by Jan.15, then fell to 5,000 by 20th; to 4,100, Feb.16; 2,600, Feb.21-March 2, to 1,000 on 7th and only 90 on 8th (the last birds seen). Four flew S.W. past New Grounds, Sept.24; eleven present on 27th; only 47 on Oct.12 and then a slow build up to 450 by Nov.30; 2,300 present, Dec.2 and 2,600 by end of year. Another good breeding season (47% young) after the poor year in 1971 - see *Report* 1972 p.235. At Aust, 51 flew N.E. on Jan.6 and 15 on Dec.1; 38 were seen at Wick on Jan.25; 20 at Chittening, Dec.1 and 19 next day.

S. 100 to N.E. over Uphill, Jan.6; 32 at Sand Point, same day, and 12 on 25th; 14, Kewstoke on 12th and 60 over Claverton Down, Bath, on 24th. Five at Clevedon, Feb.6 and five at Chew Valley res. from the 10th - March 11; one at Brean Down, Feb.18. Eleven at Sand Point, Nov.28, also 18 on Dec.4 and three on 11th. One at Cheddar reservoir on Dec.1; eight at Chew Valley on Dec.27 then six to end of year.

LESSER WHITE-FRONTED GOOSE *Anser erythropus*

G. An adult was at the New Grounds from Dec.2 to end of year (PS *et al.*).

BEAN GOOSE *Anser fabalis*

G. An adult of the Russian race, *A. f. rossicus*, was at the New Grounds from Jan.2 to March 2; and an adult *A. f. fabalis* from Dec.6-31 (WT).

PINK-FOOTED GOOSE *Anser brachyrhynchus*

G. One adult, New Grounds, Jan.1 to mid-Feb. and two, Dec.20-31 (WT).

S. One was seen with five Whitefronts at Chew Valley reservoir on Feb.18 and one at Cheddar reservoir on March 14.

DARK-BREASTED BRENT GOOSE *Branta b. bernicla*

G. An adult bird was present at the New Grounds, Jan.1-March 4, and a first-winter bird from Nov.27 to the end of the year (WT).

BARNACLE GOOSE *Branta leucopsis*

G. Up to four, present, New Grounds, Jan.2-March 2 (WT); one seen at Severn Beach on Feb.18 (DVM, GCW) may well have been an 'escape'.

CANADA GOOSE *Branta canadensis*

G. New Grounds: 30, Feb.10 and 41 (Frampton Pools) on 23rd; 76, Dec.18. Two landed at Monk's Park School, N. Bristol, then flew N., March 30 (ML).

S. A pair was present at Chew Valley reservoir all the year (three young reared); also a party of five, July-December; one, Cheddar res., Feb.23.

WHOOPER SWAN *Cygnus cygnus*

G. Four (a pair with a juvenile and another adult) as New Grounds, Jan.29-Feb.25; and two adults, Dec.15 and next day (WT).

S. Two at Blagdon reservoir on Jan.18; one at Chew Valley, Nov.17-25.

BEWICK'S SWAN *Cygnus bewickii*

G. During the winter 452 individuals recorded at New Grounds (19% young); largest count 325 on Jan.8. The first autumn arrivals appeared from Oct. 13, numbers reaching a peak of 294 on Dec.31; a total of 428 individuals identified, including 28% young - the best for several years (WT). One flew N. over Horfield and four over Monk's Park, Bristol, on March 2. Three at Sheperdine, Nov.9 and ten between Severn Beach and Avonmouth on Dec.1.

S. Reservoir records: nine at Chew Valley, Jan.3 and ten on 4th; one in October, seven, Nov.1 then one or two to 25th; 18, Dec.30; one at Cheddar on Jan.7, two on 27th and eight on 31st; one dead, Feb.4; one, Mar.11 and 38 on 14th; one, Oct.22, then up to 14; up to four in November, and 17 (monthly max.) on Dec.15; 30, Blagdon, March 19; ten, Oct.27; 17, Nov.1, 15 on 2nd and three on 14th; up to five in December. Two overhead, Barrow Gurney resrs., Dec.30. Coastal records: a herd of 13, Sand Point, Feb.13; one, Dec.2 and four on 16th; two, Axe Estuary, Nov.17.

BUZZARD *Buteo buteo*

G. Reported during breeding season from Nailsworth, Cromhall, Kilcot, Doynton, Horsley/Kingscote area, New Grounds and North Stoke. Autumn and winter records from New Grounds, Michaelwood, Tortworth, Cromhall, Hallen, Oakford near St.Catherine and, in Bristol, over Clifton, Henleaze and Stoke Park. One over Redland (Bristol) in April.

S. Bred successfully at one locality near Bath (JL) and up to three pairs probably bred in Chew Magna/Chewton Mendip area. Resident at Abbots Leigh - usually single birds seen, but three in April and seven together on Sept.26 (MAS). Other records of up to two birds in breeding season from other Mendip localities, Blagdon (juvenile seen, Aug.18 - PJC), Pensford, Lansdown, Charmy Down, Goblin Combe, Failand, Portbury and Gordano valley, including a pair, Weston Moor, of which one was later shot (HRH). Autumn and winter records from Yoxter (Mendip), Blagdon area, Chew Valley reservoir, Rode, Combe Hay, Midford, Friary Wood (Bath), Lansdown, Pipley Bottom, Saltford, Portbury, Failand, Wraxall and Gordano valley.

SPARROWHAWK *Accipiter nisus*

G. Breeding records from Frampton Pools (JDS) and Slimbridge (MAO). Also reported in breeding season from Gossington, Cromhall, Tytherington, Duck-hole (Thornbury), Wick and Conham (Bristol). Twenty other records from January to March and August to December.

S. Three pairs reared young in Abbots Leigh area (per TBS). Bred also near Axbridge (JAMcG), Blagdon res. (RMC), Keynsham and Bath (B). Recorded in breeding season also from Rode, Downside, Chew Valley reservoir, Cheddar, Compton Bishop, Crook Peak, Loxton, Brean Down, Weston Wood (probably bred) and Portbury. Some 50 other sightings, Jan. - March and August-December.

HEN HARRIER *Circus cyaneus*

S. A female or immature bird over Steep Holm, Oct.8, 1972 (SHGRS).

MONTAGU'S HARRIER *Circus pygargus*

S. An immature male between Velvet Bottom and Priddy, April 26 (VG, MH).

OSPREY *Pandion haliaetus*

S. One was present at Chew Valley reservoir, April 18-27 (KTS, KEV).

HOBBY *Falco subbuteo*

G. Records in breeding season from two localities, including two birds together at one place. Also single birds at Frampton Pools, April 15 (RKB); Downend, April 30 (PSH); Sea Mills, Bristol, May 7 (TBS); West Littleton, Aug.22 and Hallen, Aug.30.

S. Records from nine localities in breeding season, including two birds together at three sites. Single birds seen at Monkton Combe, April 26 (PARH); Cheddar reservoir, April 28 (BR) and July 24; Chew Valley res. on many dates, May 3 to Sept.22 (many observers); Lansdown Road, Bath, May 25 and 28th (B); Middle Hope, June 7 (TB); Wrington Vale, Aug.12; Blagdon reservoir, Aug.27 (PJC, RNC); Chilcompton, Sept.12 (RSH); Rode, on 18th (CC); Downside, on 20th (RSH); and Walton-in-Gordano, Oct.14 (DP, DHP).

PEREGRINE *Falco peregrinus*

G. Single birds seen, New Grounds, Jan.-March and Dec.26 (LPA, SBE, AHD); and Sheperdine, Aug.26 (JRH).

S. Single birds, Brean Down, several dates, Jan.7-March 26, Sept.30 and Oct.6; Sand Point, Feb.14, Aug.8 and Oct.21; Gordano Valley, April 29, Nov.4 (two birds) and 11th; Kingston Seymour, Aug.12 and St.George's Wharf, Dec.16 (RA, PJC, ACK, AP, TBS *et al.*).

MERLIN *Falco columbarius*

G. New Grounds area: a female, Jan.15 (LPA) and a male, Feb.4 (TDE, JWH). One, Avonmouth, Feb.8 (JRM).

S. Single birds recorded from Midford, Jan.7; Chew Valley res., Jan.14, Feb.18, Sept., Oct.13, Nov.1 and Dec.16; Sand Point, Jan.16, March 15, Sept.11 and 26th, Oct.14 and 22nd; Blagdon res., March 27 and Oct.4; Clapton-in-Gordano, Oct.13; Portbury on 14th and Dec.16; Brean Down, Oct.18; Barrow Gurney, Nov.1 and Clevedon on 18th.

RED-FOOTED FALCON *Falco vespertinus*

G. A sub-adult bird was seen at Frampton on Severn on May 25 (JRH). Record accepted by *British Birds* Rarities Committee.

KESTREL *Falco tinnunculus*

Common and widely distributed. Analysis of sightings over Bristol suggests fifteen pairs resident; breeding proved at six sites. Monthly distribution of all records received was as follows. Line (a), Bristol (G); line (b), Bristol (S); line (c), other G; line (d), other S.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
(a)	10	5	10	19	15	5	8	3	7	12	3	8
(b)	0	2	3	16	8	0	1	1	2	7	1	0
(c)	10	12	35	35	42	11	10	7	5	10	4	9
(d)	15	28	71	82	59	21	17	35	30	31	37	20

The high spring totals reflect breeding-season conspicuousness and effect of a special appeal. 70% of the records were along motorways or main roads, including M32 inside City.

RED-LEGGED PARTRIDGE *Alectoris rufa*

S. Breeding-season records from Portbury Wharf and Wavering Down.

PARTRIDGE *Perdix perdix*

Breeding-season records from only six localities.

QUAIL *Coturnix coturnix*

G. One calling at Marshfield on July 4 (RMC).

WATER RAIL *Rallus aquaticus*

S. Breeding-season reports only from Chew Valley reservoir.

SPOTTED CRAKE *Porzana porzana*

S. Single birds at Chew Valley Lake, Sept.26 and Oct.27 (KEV).

COOT *Fulica atra*

Widespread as a breeding species in the area. At Cheddar reservoir where the largest concentrations occur outside the breeding season, the maximum counts were some 1,500 in February and again in early October; at Chew Valley, maxima were 583 in March and some 980 in July. At Frampton Pools, the peak count was 350 in December. The partial albino seen at

Cheddar in December 1972 stayed there, and occasionally at Blagdon, until March; one (the same?) appeared at Cheddar in October.

OYSTERCATCHER *Haematopus ostralegus*

G. One, Oldbury on Severn, Feb.4th. One at New Grounds, March 31; up to six in May and July and up to three thereafter. Up to three, Severn Beach to Chittening, Aug.11 to end of year.

S. Present on coast from January to May 5 and from July 8 to December, with largest counts as follows: 20, Clevedon (Feb.); 80, Yeo Estuary (April); 50, Sand Bay (Nov.) and 150, Axe Estuary (September). Reservoir records: one, Cheddar, May 13; four at Chew Valley, April 14; single birds there, June 28 and July 22 - Aug.18 (but up to 17, Aug.6-8). On Aug.25, 1970, a flock of 30 flew in to Chew Valley reservoir (BLK) - record just received.

LAPWING *Vanellus vanellus*

G. Largest counts were from New Grounds: 600-700 in February; 400 in June rising to 1,800 in July; 1,100 in September. 500 at Marshfield, July.

S. Only large movement reported was some 2,500 over Rode in December. The main concentration was at Axe Estuary, where up to 3,000 were present in January and February and 2,000-2,500 in December. Large numbers also at reservoirs (peaks of 750, Blagdon, Sept.; up to 2,500, Chew, late July) and on moors (peaks of 500, Kenn, July and 400, Nailsea, July and winter).

RINGED PLOVER *Charadrius hiaticula*

A pair bred, St.George's Wharf (S); two young ringed, June (WGB, PJC).

Monthly peak counts in main areas: (a) New Grounds; (b) Oldbury to Sheperdine; (c) Severn Beach to Chittening; (d) St.George's Wharf; (e) Sand Bay; (f) Weston Bay and Axe Estuary; and at reservoirs: (g) Blagdon; (h) Chew Valley; (k) Cheddar. Blanks denote no information.

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(k)
Jan.		200	200	0	150	56			
Feb.			50	0	60	54			
March			20	0	65	11			
April	3		60	4	4	1		8	1
May	25		300	25	38			10	
June	11		25	3	12				1
July	28	37	42	5	50			5	
Aug.	453	318	1200	29	650	60	27	50	3
Sept.	80	60	200	14	650	100	50	25	2
Oct.			200	0	17	58	3	4	3
Nov.		6	100	0	40	65		12	
Dec.		24	100	0	37	89			

LITTLE RINGED PLOVER *Charadrius dubius*

Single birds noted at New Grounds and Chittening and at Cheddar and Chew Valley reservoirs, April 8 - May 18; two at latter place, May 22. On autumn passage, 34 records of up to three birds, July 6 - Sept.23; most at reservoirs, but seen also at New Grounds (July 31) and Chittening and at Portbury Wharf.

KENTISH PLOVER *Charadrius alexandrinus*

S. One, St.George's Wharf, Aug.19 (WGB) with party of Ringed Plover including juveniles. Detailed description supplied.

GREY PLOVER *Pluvialis squatarola*

G. New Grounds and Severn Beach - Chittening: up to four, January to May 20 (14 records); and up to nine, Aug.12 to December (42 records), but up to 23 in late September.

S. Noted every month on coast (34 records), mostly at Sand Bay, where 52 were seen on Jan.25, up to 24 from September to November and 35 on Dec.12; up to three elsewhere. Reservoirs: one at Chew Valley, May 19/20 - an exceptional spring record; 8 or 9 there, Oct.13, otherwise single birds there and Blagdon and Cheddar, occasionally from July 28 to end of year.

GOLDEN PLOVER *Pluvialis apricaria*

G. Up to 60 at New Grounds in January, February and October; up to four in May, August and September. 150 at Aust in February.

S. Noted from January to April 23 (24 records) and Aug.25 to December (31 records), the largest counts being at Axe Estuary (peaks of 550, January and 750, December), Brean Down (420 in November) and Kenn Moor (250, January). Counts of 100 or more also from Burnett, Queen Charlton, Marksbury, Nailsea Moor and Clevedon coast.

TURNSTONE *Arenaria interpres*

G. Present from January to June 6 and July 16 to December, mainly from Chittening to Severn Beach (up to 250) but occasionally up to 100 from Littleton to Severn House Farm and from Sheperdine to Oldbury on Severn.

S. Noted on coast from February to May 1 (mainly near Clevedon, where up to 40 seen) and July to December (up to ten, St.George's Wharf and Clevedon, up to four elsewhere). Two, Cheddar reservoir, April 24 and one or two there and Chew Valley, July 26 - Aug.18th.

SNIPE *Gallinago gallinago*

G. Only nine reports, all of fewer than ten birds.

S. Bred, Kenn and Nailsea Moors and Ashton Vale, and probably in Gordano Valley. Also 69 reports from coast, moors and reservoirs, January to May 6 and July 29 to December. Largest counts were at Axe Estuary (320, December), Kenn Moor (200, January), Nailsea Moor (200+, March) and Chew Valley reservoir (200, November). Many other reports were of 50 or more birds.

JACK SNIPE *Lymnocryptes minimus*

G. Ten reports of single birds: Chittening to Aust in February, March and December, at New Grounds in November and at Avonmouth in December.
S. Thirty-four reports, January to April 18 and Sept.19 to December; most were of single birds, but up to four seen at Sand Bay, Jan. and Feb. and up to nine in December; five birds, Ashton Vale, April 18, and up to four at Blagdon and Chew Valley reservoirs, in September.

WOODCOCK *Scolopax rusticola*

G. One flew over Horfield, Bristol on Nov.1st. No other records received.
S. Fourteen reports of single birds, January to May 23 and Oct.16 to December, from Stock Hill (Mendip), Wellow Brook, Barrow Gurney reservoirs, Kenn Moor (March 11), Abbots Leigh (roding), Failand, Gordano Valley, Weston Woods; 18 shot, Abbots Leigh - Failand, in Boxing Day shoot (*per* TBS) and six more seen on 29th.

CURLEW *Numenius arquata*

Present all months but not breeding (82 reports from G and 97 from S). Main winter numbers of order of 150 at New Grounds; 100, Severn Beach to Chittening; 50, Portbury and St.George's Wharves; 40, Clevedon; 50-100 from R. Kenn to R. Yeo; 50, Woodspring Bay; 120, Sand Bay; 50, Weston Bay and Axe Estuary; smaller numbers elsewhere on coast; occasionally a few inland at reservoirs and elsewhere. Steady fall from mid-March to end of April; very small numbers May and June then rapid rise with autumn passage - distinct peaks end July and end August (up to 584 and 507 respectively at New Grounds, 200 at Severn Beach area and at Sand Bay); numbers at winter level by end of October.

WHIMBREL *Numenius phaeopus*

Spring passage April 14 - June 15; 47 reports (16 from G) included 70+ at Brean Down on May 12 and several parties of 30-50. Autumn passage from July 1 to Sept.30 was smaller, with 35 reports (13 from G) mostly of one or two birds but up to eleven, Aug.10-27th, with 127 moving to S.W. in three hours over Sand Bay on Aug.11th (TB).

BLACK-TAILED GODWIT *Limosa limosa*

Fewer than in recent years. On the coast, eight reports (three from G), January to June 17; and 34 reports (19 from G), July 2 to December; most were of under ten birds, but 52 were seen at Axe Estuary on Sept.15 and Oct.27th. Reservoirs: single birds at Chew Valley, April 1, Sept.24 and in December; also up to four, June 15 and July 8 - Aug.10; one at Cheddar reservoir on Oct.28th.

BAR-TAILED GODWIT *Limosa lapponica*

On the coast, 33 reports (20 from G), January to May 28; 54 reports (28 from G), July 16 to December. Most were of fewer than five birds, but up to 17 in April and May and in September, and up to nine, October to end year. One or two at Blagdon and Chew Valley reservoirs, Sept.16 to December and one at Cheddar, Nov.24th.

GREEN SANDPIPER *Tringa ochropus*

Noted from January to May 20 (28 records, including one in G and nine from Chew Valley res.) and from June 15 to December (154 records, incl. six in G, 96 from Chew Valley and 17 from other resrs.). Most were of one or two birds, but up to six occurred at the reservoirs, with up to ten at Chew in July and September and up to 18 in August. Up to 10, Portbury Wharf in August. Reservoir records reflect low water levels.

WOOD SANDPIPER *Tringa glareola*

G. Single birds at the New Grounds on July 17, 29th and Aug.7th; 2 on 8th and 7 to N. on 12th.

S. Single birds at St.George's Wharf, April 15 and 23rd, Aug.26-28, Sept. 2 and 16th, Oct.14 and 21st; and at Sand Bay, Sept.2nd. Reservoirs: one at Chew Valley, May 19/20; up to three, June 28-Oct.21 (30 reports) with seven on July 30; single birds at Blagdon on Sept.2, 28th and 29th.

COMMON SANDPIPER *Tringa hypoleucos*

Winter records of up to three, January to March 26, and mid-October to end of year, from coast, reservoirs and R. Avon (Sea Mills area). Spring passage from mid-April to mid-May with a peak of 34 at Cheddar reservoir and nine at Clevedon. Autumn passage much larger and longer, with many records, especially from reservoirs: peaks of 14, Barrow Gurney, Aug.24 and eight, Blagdon, Sept.3; many records of 10-21 from Chew Valley and Cheddar and up to 12 on coast, July 1 to early October. A few records in spring and autumn of one or two birds on R.Avon as far inland as Monkton Combe.

REDSHANK *Tringa totanus*

Proof* or strong indication of breeding from New Grounds* (G) and Portbury to R. Yeo*, Woodspring Bay and Nailsea Moor (S). From January to March and October to December, peak counts were 70, New Grounds; 200, Aust; 300, Severn Beach to Chittening; 250, Clevedon to R. Yeo; 200-250, Sand Bay and 300, Axe Estuary. Up to five at the reservoirs, all months, but more in June-July (up to 38, Chew Valley). Large passage, July to September, with flocks of 700 to 1,000 in late August and early September.

SPOTTED REDSHANK *Tringa erythropus*

G. New Grounds area: up to two, April 16 - May 8; up to 12, June 24 to end of August; up to 24, September and October and single birds in November. One at Chittening on May 18. 42 records.

S. Noted from March 11 - June 18, and July 19 to end of year. Occasional single birds (rarely two) on coast; 60 of the 80 records were from the reservoirs, with single birds to Aug.22, then up to 17 at Blagdon and 13 at Chew Valley to late October and then up to seven at Chew to the year end; single birds at Cheddar, late September and at Blagdon on December 15th.

GREENSHANK *Tringa nebularia*

G. More plentiful than in 1971. New Grounds area: one, April 21 (TDE); up to eight, July 2 to early August, increasing to 20 by 26th, declining to eight by Sept.24, then one or two to Oct.15. One at Chittening in July.

S. More plentiful than in 1971. Winter records: one, Portbury, Jan.2 (TBS) and one, Chew Valley reservoir, Dec.24 (MS). Spring: one or two noted on coast, April 1 - June 2 and at Chew Valley res., April 24 - May 31; one, Cheddar reservoir, May 5. Autumn: noted on coast, July 7 - Nov.21 (up to nine at Sand Bay, up to six elsewhere) and at the reservoirs, July 8 - Nov. 11, with peaks of 17, Chew Valley, in late August and up to 42 at Blagdon, early September; one at Barrow Gurney, May 24, and single birds at Cheddar, Sept.16 - Oct.7th.

KNOT *Calidris canutus*

Apparently a further decrease. On the coast, 18 records (9 from G), January to May 20, all of under five birds except at Sand Bay (up to 140) and Axe Estuary (up to 35); 46 records from July 17 to end of year (half from G) were mostly of under 12 birds, and occasionally up to 35; the only larger counts were from Severn Beach - Chittening (up to 200, Oct.), Clevedon (up to 300, Oct. and 500, Nov.), Sand Bay (up to 250, Dec.) and Axe Estuary (45 in Nov. and 60 in Dec.). Occasional records of single birds in August and September at Chew Valley reservoir.

PURPLE SANDPIPER *Calidris maritima*

G. One or two, Chittening to Severn Beach, January - May 18 and December.

S. Four, Brean Down, April 15. Single birds at Sand Point in July and October. One dead at Axe Estuary in November.

LITTLE STINT *Calidris minuta*

Up to four on coast and at Chew Valley reservoir, January to May 16 (14 records). In autumn, up to six on coast (37 records, July 29 - Dec.2); up to ten at Chew Valley reservoir (23 records, Aug.25-Dec.31); up to six at Cheddar (18 records, Sept.13-Nov.4) and up to 17 at Blagdon (17 records, Sept.15-Oct.7). Exceptional passage, late September, with parties of up to 33 at New Grounds, Sept.23-Oct.15, and of up to 40 at Blagdon and 46 at Chew Valley, Sept.27-30th.

TEMMINCK'S STINT *Calidris temminckii*

S. One was trapped and ringed at Chew Valley reservoir, Aug.28. One seen on Sept.1, 6th and 9th may have been same bird but ring not noticed (CVRS).

PECTORAL SANDPIPER *Calidris melanotos*

S. Two at Chew Valley reservoir (Heron's Green), Sept.19-30 and one on Oct.13/14 (AHD, PJC, RMC, KEV *et al.*).

DUNLIN *Calidris alpina*

Most numerous wader of area by far. General along coast, R. Avon up to Sea Mills area, and reservoirs. Main flocks at Severn Beach - Chittening, Clevedon - R. Axe, Sand Bay and Weston Bay. Approximate monthly totals in area are tabulated: first line, coast; second line, reservoirs.

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
17500	12500	13100	3100	1600	120	2000	2300	1350	12000	14500	16000
120	50	17	17	24	18	20	90	130	260	1000	1170

These may include some double counts; also, large flocks sometimes cross the Estuary. Reservoir numbers reflect low water levels in autumn.

CURLEW SANDPIPER *Calidris ferruginea*

G. One, New Grounds, May 7 (LPA) and up to two, July 29-Oct.15, but up to five in September (LPA, AMH). One, Severn Beach, Aug.28 (PJC, RGT).

S. One, Chew Valley reservoir, May 26 (AHD); one, St.George's Wharf on 27th (WGB). Autumn passage: up to four, Sand Bay, July 19-Sept.16 (RA, TB); one, St.George's Wharf, Sept.30 (WGB). Also 39 reservoir records: Chew Valley (July 21-Oct.13), Blagdon (Sept.15-30), Cheddar (Sept.19 to Oct.28), mostly of one or two birds, but more in late September, when up to seven were seen at Chew and 10 at Blagdon (RMC, TRC, MGW *et al.*).

SANDERLING *Calidris alba*

Up to 22 birds at Sand and Weston Bays (S), January to March 3 and Nov. 14 to end of year. Noted on passage at same places and at New Grounds, Severn Beach - Chittening and occasionally elsewhere, April 3-May 23 and July 17-Oct.16 (up to 22 birds); also at reservoirs, April 30-May 23 (up to nine) and Aug.25-Sept.16 (one or two).

BUFF-BREASTED SANDPIPER *Tryngites subruficollis*

S. One was present at Blagdon reservoir, Sept.15-21 (WGB, PJC, RMC, AHD, AM *et al.*). The record, third for Somerset and third for Bristol district, has been accepted by *British Birds* Rarities Committee.

Described as a small wader, size of Common Sandpiper, with a small buff-coloured head, lighter on cheeks; crown streaked brown; upper-parts buffish grey, with 'scaly' appearance due to pale feather edgings. Breast buff becoming paler on belly and under-tail coverts. Long wings, extending beyond tail, giving long, tapering appearance; no wingbar; dark central tail feathers. Legs light in colour. Flight fast. Trilling call.

RUFF *Philomachus pugnax*

G. New Grounds: seven records of up to 27, Feb.8-April 24, and 25 records of up to 39, July 16-Nov.12.

S. Up to three noted on coast, March 16-May 1 and Aug.25 to Sept.3rd. Reservoirs: at Chew Valley, up to seven, March 11-Apr.29 (10 records) and up to 18, June 15-Dec.31 (84 records); at Blagdon, up to 20, Aug.4-Nov.17 (19 records) and at Cheddar, up to 15, Oct.14-Nov.8 (6 records).

GREY PHALAROPE *Phalaropus fulicarius*

S. One at Weston Bay, Sept.29 (RA) and one at Cheddar reservoir, Oct.13 to 16th (RMC, TRC, SBE, CJ, RCJ *et al.*).

GREAT SKUA *Stercorarius skua*

G. One over the estuary off Chittening, May 14.

S. Brean Down: single birds, March 26 and April 1; three on 5th and two on 13th; single birds May 5, 30th and June 13th. Single birds off Sand Point on Aug.7 and at Walton Bay near Clevedon on Sept.13th.

ARCTIC SKUA *Stercorarius parasiticus*

G. Four at New Grounds on April 23, two on May 1 and one on Sept.11 (LPA).

S. Single birds off Brean Down on April 22, 29th, May 12 and two, May 5 and 24th. One off Sand Point, June 13 and two on 20th (RA, TB, RCJ, BR).

POMARINE SKUA *Stercorarius pomarinus*

S. Three flying north off Brean Down, May 24 (BR).

LESSER BLACK-BACKED GULL *Larus fuscus*

Pairs bred on roofs in Cumberland Road (G) and Redcliffe (S) areas of Bristol (TBS *et al.*) and in Bath (RMC). Well over 400 were present at the Chew Valley reservoir roost on Feb.11th.

HERRING GULL *Larus argentatus*

G. A pair were seen with young on a roof in Cumberland Road, Bristol (TBS).

COMMON GULL *Larus canus*

G. 201 were counted, with 405 Black-headed Gulls, in a northerly movement over the New Grounds on March 19 (LPA).

S. At the Chew Valley reservoir roost, 3,500 to 4,000 were present in January and February; many fed on Mendip - 620 counted at Priddy on Jan.21st.

ICELAND GULL *Larus glaucoides*

G. One was seen over the Severn Estuary at Purton, Sept.16 (SRK).

S. A first-winter bird was present at Cheddar reservoir on Jan.2, a second year bird at Chew Valley, April 7 - May 28 and another at Cheddar, Sept.25 to 29th (AHD, JAMcG, KTS *et al.*).

MEDITERRANEAN GULL *Larus melanocephalus*

S. An adult (in delayed moult) was seen at Chew Valley reservoir on May 6 (RCFH) and another at Cheddar reservoir on Oct.8 (BR).

LITTLE GULL *Larus minutus*

G. Reports from New Grounds area, April 1 - July 17, mostly of one or two immature birds, but up to five in late May and June and an adult, June 30th.

S. Frequently reported from reservoirs, February to May 6 and July 28 to Nov.14; mostly one or two immature birds, but four at Chew, May 6 and up to five in August, including one or two adults. More adults, in ones and twos, from Sept.29th.

BLACK-HEADED GULL *Larus ridibundus*

An adult female found dead of tuberculosis at the New Grounds on May 18 had been ringed in Sweden, June 13, 1964 (LPA). One found dead at Chew Valley res. on Feb.3 had been ringed as a nestling in Finland in June 1970.

SABINE'S GULL *Larus sabini*

S. An adult was seen at Chew Valley reservoir on Sept.27 (JDRV) and an immature bird at the same place on Oct.3 (DB).

KITTIWAKE *Rissa tridactyla*

G. New Grounds: 18, April 2 and two on May 8; one at Chittening, Aug.27.

S. Fewer were noted than in recent years (total approx. 250) and movements were later. The largest counts off Brean Down were 15, April 13; 14 next day; 77 on May 22 and 35-40 on the late date of Nov.15 (a juvenile was seen over Rode four days later). Off Sand Point the largest counts were 14 on April 4; 25 on May 1 and 15 on Aug.8th.

BLACK TERN *Chlidonias niger*

G. New Grounds area: five, April 29; single birds, May 5 and 20th, Aug.11, Sept.1-4 and 16th.

S. Small spring passage: six, Chew Valley reservoir, April 26; four, May 5 (20, same day, at Brean Down) then single birds to June 2; three, Sand Point on May 1 and nine on 12th; 15, Cheddar reservoir, May 4. A few records of up to five birds from late June to early August, then 16 at Chew Valley reservoir on 12th, 28 on 15th, 30+ on 18th, 24 on 22nd and 42 on 27th (25, same day, at Cheddar res.); and up to 20 in early September. Subsequent records were mostly of single birds, with up to six occasionally, until Nov.11th.

COMMON TERN *Sterna hirundo* ARCTIC TERN *Sterna paradisaea*

First recorded on April 19; largest spring movements were 166, at New Grounds and 10, Chew Valley res., both on April 23; 45, New Grounds and 290 off Brean Down (but only 7 off Sand Point) on 29th; 60, Brean Down and 7, Sand Point, May 24th. No large autumn counts were received; up to 18 birds at Chew Valley reservoir, July to September (but 38, Sept.4); usually from one to three at Blagdon, but 8, July 1; from four to six at Cheddar, August and September, but 20, Sept.19, 11 on 21st and 10 on 29th; 15, Sand Point, Aug.7 and 13, New Grounds, Aug.12th. Last recorded on Oct.21st.

ROSEATE TERN *Sterna dougallii*

S. One with Common/Arctic Terns, at Chew Valley reservoir, May 6 (CJ, RCJ).

LITTLE TERN *Sterna albifrons*

S. Recorded on spring passage in May; single birds at Portbury Wharf on 6th and at Chew Valley reservoir on 8th and 31st. On autumn passage, records of two at Chew Valley, Aug.2 and Sept.4, and single birds on Aug.19, 22nd and 23rd. An adult, at Sand Bay, Sept.16th.

SANDWICH TERN *Sterna sandvicensis*

Many more records than usual - a total of 39 birds seen on 19 days.

G. Two, New Grounds, May 22 and Sept.10; and two, Frampton Pools, July 1.

S. Brean Down: four, April 29; two, June 10; single birds, July 6 and 20th. Sand Point: four, April 29 (see above); three, May 1 and Aug.7; two, May 10, June 13 and July 2; and single birds, May 8 and 16th. Chew Valley reservoir four, Aug.13 and one on 28th; two, Sept.2, 14th and 23rd.

AUK sp.

S. Noted off Brean Down (species not certain); 10, April 1 and two on 29th; 15, May 5; two, June 10 and one on 13th; one, Oct.14 (DMC *et al.*).

RAZORBILL *Alca torda*

S. Single birds off Sand Point on May 13 and June 13, and one dead in Sand Bay on July 29 (RA, TB).

GUILLEMOT *Uria aalge*

S. One flew to S.W. off Sand Point on June 3 (RA).

STOCK DOVE *Columba oenas*

In Bristol, some five pairs at each of Vassalls and Stoke Parks (G). The only flocks of over 20 birds reported were 55+ at Blagdon reservoir in June and 30 near Charterhouse in November (S); and some 100 at Chittening Warth (G) in December, with a large flock of Woodpigeons.

TURTLE DOVE *Streptopelia turtur*

Seventeen records, April 25 - Sept.14, mostly of up to two birds, from Cromhall, Lower Woods (Wickwar), Thornbury, Severn Beach, Tormarton and Marshfield (G); and Friary Wood (Bath), Limpley Stoke, Nailsea, Charterhouse, Cheddar and Chewton Mendip; up to six to E., Portbury, in May (TBS).

COLLARED DOVE *Streptopelia decaocto*

Now common in almost all parts of district. Nesting reported from many areas in Bristol, also regular feeding from bird tables close to houses.

CUCKOO *Cuculus canorus*

Males calling from April 23 to June 17; two single birds seen on Aug.26 at Nailsea Moor and St.George's Wharf were presumably juveniles. One ringed at St.George's Wharf in June 1971 was retrapped nearby at Portbury on April 24. Young found in Dunnocks' nests at Falfield and Tockington (G).

BARN OWL *Tyto alba*

G. Single birds reported from Pipley Bottom, Feb.25; Chittening, in March and Aug.25/26; Northwick in April and Doynton on Nov.12.

S. Breeding season records of single birds from Portbury, Winford, Chew Valley reservoir, Hunstrete, Radstock, and Stock Hill, Mendip. Records from ten localities of single birds, January to March and September to December.

LITTLE OWL *Athene noctua*

Reports from 32 localities (12 in G) covering all months. Only records of breeding were from Chew Valley res., Chew Stoke, Lansdown and Portbury.

SHORT-EARED OWL *Asio flammeus*

G. New Grounds: one, March 12 (MWS); one, Oct.7-Dec.4, but four on Nov.1 then two to 19th (LPA, RMC, TDE *et al.*). Severn Beach: one, May 11 (HB) and one, Nov.3 (RGT). Chittening: one, Feb.26-April 23 but two, March to April 14; two, Oct.14; four, Dec.26 and three on 30th (NTL, RGT).

S. Single birds at Sand Point, Jan.6 (TB); Rode, March 3 (CC); Portbury Wharf, April 20 and 26th, then two on 28th/29th (KGH, MRH, TBS); Brean Down April 29 (F); Cheddar res., Oct.30 (JB); Kenn Estuary, Dec.26-29 (WBC).

LONG-EARED OWL *Asio otis*

S. Heard at two localities, January to March, but no evidence of breeding.

TAWNY OWL *Strix aluco*

Considered to be widespread as a breeding species, but records received from only 19 localities (of which 9 were in G). Breeding records only from Badock Wood, Bristol and Doynton (G); and from Nailsea and Chew Valley reservoir (S). Bred in nest-box at latter place (CVRS).

SWIFT *Apus apus*

First noted, April 29 - May 2; main departure, Aug.10-14; latest noted were eight, Sand Point, Aug.25 and two, Chew Valley res. on Sept.1st. As usual, very large numbers feeding at Chew Valley - some 10,000 on May 13, then slow decline, with 8,000 on June 10 and 3,000 to 4,000 in mid-July. A bird ringed as an adult at Ashley Down, Bristol on July 20, 1966 was hooked by a fisherman at Blagdon res., July 23, cared for and released at Weston.

HOOPOE *Upupa epops*

S. One at Sand Bay, May 16 (TB).

LESSER SPOTTED WOODPECKER *Dendrocopus minor*

Observations almost certainly considerably under-estimate real status.

G. Breeding season records from Cromhall, Winterbourne, Westbury-on-Trym, along R. Frome from Eastville to Stapleton (Bristol) and Wick.

S. Noted at N. Widcombe, Downside and Blagdon and Chew Valley reservoirs.

WRYNECK *Jynx torquilla*

G. One feeding on lawn, Wick, Sept.1 (DRH).

S. Calls heard at three different points, Downside Estate, March 26 (RSH).

SHORT-TOED LARK *Calandrella cinerea*

S. One at Brean Down on June 16 (RA). The record, accepted by *British Birds* Rarities Committee, is the first for Somerset.

The bird was described as being smaller and paler than Skylark; upperparts pale buff with brown streaking; underparts white and unmarked. Black mark each side of lower neck. Bill conical.

WOODLARK *Lullula arborea*

S. Two males, Brean Down, April 26th. Up to four, Sand Point area, Aug.2, Oct.14, Nov.4 and 6th. One, Clevedon, Oct.27. (RA, TB, PJC, ML).

SAND MARTIN *Riparia riparia*

S. Breeding records from Bedminster, Bristol; R. Avon between Bath and Saltford; and near City weir, Bath.

RAVEN *Corvus corax*

No proof of successful breeding, but reports covering all months from New Grounds, Berkeley and Lower Kilcott (G); and Wrington Warren, Sand Point, Worlebury, Weston Wood, Brean Down area, Clevedon, Cheddar Gorge, Chew Valley reservoir, Emborough and Monkton Combe (S).

WILLOW TIT *Parus montanus*

Reports from Inglestone Common (G) and Stock Hill Woods (S) usually of single birds but sometimes of two (AM, JAMcG, APR).

DIPPER *Cinclus cinclus*

Reports of up to three from Michaelwood and Wick (G); and Winford, Litton Wookey, Newton Park Lake and the Cam, Wellow and Midford (bred) Brooks (S).

BEARDED TIT *Panurus biarmicus*

Up to four reported from New Grounds and Chew Valley reservoir, from Oct.5 to the end of the year.

RING OUZEL *Turdus torquatus*

Reports of from one to three birds from Stoke Park, Bristol, April 5 and Filton, April 17 and Oct.23; and from Yeo Estuary, Sand Point, Brean Down and Crook Peak, March 27 to April 29 and Oct.18.

WHEATEAR *Oenanthe oenanthe*

Eighty reports of up to six birds from widespread localities, March 7 to May 26 and July 22 - Oct.29; also at least 12 large, brightly coloured birds, possibly of the Greenland race, New Grounds, April 24 (TDE).

STONECHAT *Saxicola torquata*

Breeding was proved at Brean Down and Crook Peak (S). Seventy reports (of which 25 from G) covering all months, of up to eleven birds, were received from widespread localities.

WHINCHAT *Saxicola rubetra*

Reports, April 24 to Oct.27, of up to five birds from New Grounds, New Passage, Severn Beach and Chittening (G); and from old airport, Whitchurch^{+}, Portbury and St.George's Wharves, Nailsea Moor^{+}, Clevedon, Sand Bay, Brean Down area, Charterhouse, and Cheddar and Chew Valley reservoirs (S). Breeding proved where marked $^{+}$.

REDSTART *Phoenicurus phoenicurus*

Up to three birds reported, April 21 - Oct.16, from Sheperdine, Thornbury, New Passage and Stoke Park (Bristol) (G); and from Ashton Park, Long Ashton, Brean Down, Priddy and the reservoirs (S).

BLACK REDSTART *Phoenicurus ochrurus*

Single birds reported, March 5 to May 13, from Chittening (G), and Clevedon coast, Sand Bay, Brean Down, Wrington Hill and Cheddar reservoir (S). Reported also from Brean Down area on Oct.28, Nov.3, 15th and 22nd; and from Clevedon coast, Dec.10-12.

NIGHTINGALE *Luscinia megarhynchos*

Singing males reported, April 21 - June 16, from Frampton Pools, Inglestone Common, Thornbury, Littleton on Severn, Compton Greenfield and Hallen (G); and from Leigh Woods, Dundry, Chew Valley reservoir, Wellow, Midford, Limpley Stoke and Beechen Cliff and Friary Wood, Bath (S).

GRASSHOPPER WARBLER *Locustella naevia*

Up to three singing males reported, April 16 - July 20, from Chittening and Pipley Bottom (G) and from Portbury, Clevedon, Congresbury, Sand Point, Brean Down, Bleadon, Lord's Wood, and Blagdon and Chew Valley reservoirs.

WOOD WARBLER *Phylloscopus sibilatrix*

Recorded, April 17 - Aug.27, from Blaise Woods, Bristol (G) and Portbury, Leigh Woods^{+}, Ashton Park, Brockley Combe^{+}, Goblin Combe, Weston Woods, Chew Valley reservoir, Rainbow Wood (Bath)$^{+}$, and Timsbury (S). Breeding proved at localities marked $^{+}$ (PJC).

FIRECREST *Regulus ignicapillus*

S. Single birds at Downside, Feb.12; Chew Valley reservoir, Nov.18 and Congresbury, Nov.22 (RSH, CVRS, WJH).

PIED FLYCATCHER *Muscicapa hypoleuca*

Reports of single birds, April 27 - May 12 and Aug.14 - Sept.4 from Fishponds, Henbury, Horfield and Cotham (Bristol) and Filton (G); and from

Backwell, Kenn Moor, Brean Down, Weston-s-Mare, Chew Valley reservoir, Chewton Mendip and Litton (S).

RED-THROATED PIPIT *Anthus cervinus*

S. One, Blagdon reservoir, Sept.24 (RMC, MGW). The record, the first for Somerset, has been accepted by *British Birds* Rarities Committee.

The bird, seen with Meadow Pipits, was described as a small pipit, dark brown, with dark striations on its mantle, a double buffish wing-bar and heavy blackish streaking on its flanks, the sides of its breast and its throat. Chin buff; legs pink; bill thin. Call-note very distinctive; long-drawn-out penetrating *seeee-eee*, slightly though not pronouncedly disyllabic, with a rather thin and melancholy quality.

WATER PIPIT *Anthus spinoletta spinoletta*

S. Up to 12 birds reported, Jan.6-April 23 and Oct.3-Dec.31, from Barrow Gurney, Cheddar and Chew Valley reservoirs.

PIED WAGTAIL *Motacilla alba yarrellii*

Communal roosts reported include 200 at village pond, Frampton on Severn February; up to 300 at Cumberland Basin, Bristol in March; and at least 200 at Blagdon reservoir and 100-150 at Chew Valley in late September.

WHITE WAGTAIL *Motacilla alba alba*

S. Up to seven reported, March 21-May 20, from Clevedon, Sand Bay, Uphill and Cheddar and Chew Valley reservoirs. One at Sand Bay, Sept.11 (RA) was the only autumn record received.

GREAT GREY SHRIKE *Lanius excubitor*

S. Single birds seen at Chew Valley reservoir, Jan.3; Old Wells Road, Mendip, Feb.24; Dolebury Hill, Nov.2; Blagdon, Nov.14; and Cheddar Gorge, Nov.10 and Dec.8 (SBE, RJP *et al.*).

RED-BACKED SHRIKE *Lanius collurio*

S. A female, Chew Valley reservoir, July 19 - Aug.2 (RMC, DW *et al.*).

HAWFINCH *Coccothraustes coccothraustes*

Reports of up to four from Clifton Down, Bristol (G) and Dundry, Ashton Park, Leigh Woods, Chew Stoke, Emborough Pond and Rode (S), covering the months January to April, October and November. No breeding records received

SISKIN *Carduelis spinus*

Sixty-nine reports from widespread localities, S and G (including, in Bristol, Snuff Mills and Vassalls Park), mostly of up to 30 birds, January to May 17 and Sept.30 to end of year; but 140, Frampton Pools and up to 50 in Mendip Woods, February.

TWITE *Carduelis flavirostris*

G. Two at Chittening, March 10 (NTL).

S. One at Brean Down, March 7 (BR).

REDPOLL *Carduelis flammea*

Sixty-one reports of up to 30 birds from widespread localities covering all months; 75, Stock Hill, Mendip, Feb.1 (JAMcG).

CROSSBILL *Loxia curvirostra*

S. Eleven records, Jan.18 - April 20 of up to 43 birds, mostly from Mendip woods, Ashton Hill Plantation and Ashton Court, following 'invasion' of autumn 1972. Up to four, Claverton Down (Bath) and Failand in August.

BRAMBLING *Fringilla montifringilla*

Fifty-one reports of up to 150 birds from widespread G and S localities, from January to April 24 and Oct.10 to end of year. Some 650, Chittening Warth, on Dec.30, with other finches.

CORN BUNTING *Emberiza calandra*

Resident but local. Reported in breeding season (May 2 - July 26) from Marshfield, Tormarton, Lansdown (Bath) and Priddy area; up to ten reported at other times from Chittening, Hanham, Sand Bay, Bishop Sutton and Stanton Prior.

CIRL BUNTING *Emberiza cirlus*

Resident, but only in a few localities. Twelve reports of up to three birds, Feb.18 - Sept.27, from Sand Point, Worlebury, Bleadon Hill, Shipham and the Cheddar-Draycott area (RA, JB, TRC, SBE).

SNOW BUNTING *Plectrophenax nivalis*

Three, Sand Bay (S), Feb.13 (TB). Up to three, at New Grounds (G), Sand Bay and Cheddar reservoir, Nov.6 - Dec.10 (LPA, TB, RCJ).

TREE SPARROW *Passer montanus*

Twenty-six reports, covering all months, of up to fifty birds, from 14 localities in G and S.

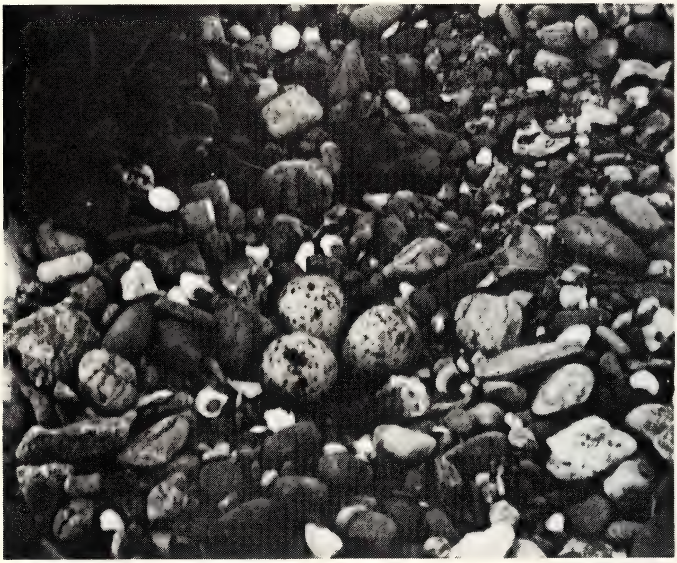
OTHER COMMON OR REGULARLY OCCURRING SPECIES PRESENT

(those marked * are mentioned in the Foreword)

Residents: Little Grebe, Greylag Goose+, Pheasant, Moorhen, Woodpigeon, Kingfisher, Green and Great Spotted Woodpeckers, Skylark, Carrion Crow, Rook*, Jackdaw, Magpie, Jay; Great, Blue, Marsh and Coal Tits; Long-tailed Tit*, Nuthatch, Treecreeper, Wren, Mistle Thrush, Song Thrush, Blackbird, Robin, Goldcrest*, Dunnock, Meadow Pipit, Rock Pipit, Grey Wagtail, Starling, Greenfinch, Goldfinch, Linnet, Bullfinch, Chaffinch, Yellowhammer, Reed Bunting, House Sparrow.

Summer or winter visitors or passage migrants: Turtle Dove, Cuckoo*, Swallow, House Martin, Fieldfare, Redwing*; Reed*, Sedge*, and Garden Warblers; Whitethroat*, Lesser Whitethroat, Willow Warbler, Chiffchaff, Spotted Flycatcher*, Yellow Wagtail.

+Full-winged Greylags from the Wildfowl Trust are regularly seen elsewhere in the area.



Ringed Plover's eggs, Severn Beach, May 22, 1912
(The species bred there also in 1913. See page 49 for the next breeding record in the district.)
Photo by R.P.Gait.

BRISTOL MAMMAL REPORT, 1973

By R.G.SYMES

The need to condense this report has meant that many interesting records have been omitted. However, all have been filed for future reference and an attempt has been made to include the most important observations. The aims of the mammal survey have been described in previous *Proceedings*. To help members wishing to record their local mammal fauna on the basis of 1-km squares, maps were produced in 1973 showing the known distribution for all species in individual 10-km squares. These provided a valuable incentive to fill gaps on the distribution maps, and altogether 81 members sent in 604 reports, including 27 first records for 10-km squares and 253 first records for 1-km squares. Particularly interesting were the discovery of a species of bat new to Somerset, and the first record from Gloucestershire for over 100 years of one rodent species.

Within two weeks of a new section of the M5 motorway being opened in Somerset, a badger and a fox were reported as road casualties. It is a sad fact that many of the mammals recorded by members have been found dead. A new hazard for small mammals was reported by D.Corke of Essex, who discovered that pull-top drinks cans may act as pit-fall traps if they fall into an upright position when discarded. Common shrews have been found dead in them. The Badgers Act 1973 was passed in July but was not due to become law until January 1974. Following last year's report of a 'feral' gerbil (*Meriones unguiculatus*) it has been learned that some survived the winter in an unheated greenhouse and burrowed under the floor in escaping (SS).

Thanks for records, newspaper cuttings, and other information go to:- G.E.Amner, B.H.Bailey, Mrs.I.M.Barrett, G.Barnfield, B.Batt, Miss M.E.Beaumont and the girls of Redland High School, R.L.Bland, R.Bowerman, *Bristol Evening Post*, Bristol Naturalists' Society Juniors, R.Brock, Mrs.M.Browne, A. & J. Buchan, R.A.Burberry, J.F.Burton, Mr. & Mrs.F.J. Bryant, P.J.Chadwick, W.B.Charlesworth, D.J.Collier, *Commercial Grower*, Miss Cox, R.M.Curber, C.J.Dallinger, I.H.Dearnley, P.Dillon, J.W.Dodson, M.J.D'Oyly, S.B.Edwards, Miss J.D.Ethelston, Gordano School N.H.S., Miss I.F. Gravestock, A.L.Hall, Miss T.M. Hamand, H.R.Hammacott, R.F. Harkness, S.Harris, Miss C.J. Haskins, B.S.F.Hessey, Mr. & Mrs. H.G. Hockey, D.J.Hughes, Mrs.J.Humphris, A.F.Jayne, M.Jayne, Miss H. Jayne, Mrs.E.M.Kerley, Mrs.M.E.Knight, J.Laver, Miss R.C. Lee, Miss E.J. Lenton, Miss S. Lewis, K.Lockyer, Mammal Section field meetings, Mrs.I.M.McKeag, J.Milton, Ministry of Agriculture, Fisheries & Food, Dr.T.A.M.Nash, *North Somerset Mercury*, R.E.Painton, Mrs.Pearce, E.W.Powell, Mr.J.G. & Mrs.S. Prince, F.H.Rawlings, A.P.Richards, Miss M.H.Rogers, Dr.R.J.G.Savage, S.Senior, D.Shaddick, Dr.C.E.D.Smith, C.Sperring, D.Stapleford, H.Stacey, R.E.Stebbings, R.Surch, R.Treble, J.D.R.Vernon, G.Walker, Miss M.V.Watcott, Miss J.B.Webb, Miss J. Weir, *Western Daily Press*, Dr. & Mrs.R.N.P.Wilton, Mrs.G.A.Winn, W.H.Young.

Check-list names and numbers are taken from Corbet (1969), except that the names 'ship rat' and 'common rat' are preferred as black and brown varieties of both these species occur. Records which represent additions to the distribution maps published by the Mammal Society (Corbet, 1971) are noted.

1. HEDGEHOG *Erinaceus europaeus*. Only one was recorded before April, then eight were seen between Apr 20 and 30. An index to the potential breeding population was that in 880 miles of motoring in April one observer (RGS) saw only two corpses on the road. The overall impression was that hedgehogs were scarce in 1973.

2. MOLE *Talpa europaea*. Heavy infestations in the Gordano Valley attracted television and press publicity in the spring. One found dead at North Weston carried two species of flea, *Palaeopsylla minor minor* (Dale) and *Hystrichopsylla talpae talpae* (Curtis), the latter being the largest British flea (RGS).

3. COMMON SHREW *Sorex araneus*. One new 10 km square record, from ST 89 (BHB). Two of those trapped at Priddy were unusual; one had a white tail tip and the other, white ear tufts (MSFM).

4. PYGMY SHREW *Sorex minutus*. New Gloucestershire 10 km square records from ST 69 (EJL) and SO 61 (AFJ).

5. WATER SHREW *Neomys fodiens*. New 10 km square record for ST 75, Somerset (IFG).

8. GREATER HORSESHOE BAT *Rhinolophus ferrumequinum*. Individuals found hibernating in caves in February (RGS, RT); one ringed; and a colony of at least 20 (most ringed) were seen regularly in a building from May 29 to Aug.28 (RGS).

9. LESSER HORSESHOE BAT *Rhinolophus hipposideros*. One found hibernating in cave on Feb.11 (RGS, RT).

-. BRANDT'S BAT *Myotis brandti*. A bat found dead in a garden on Aug.12 1972 at Sutton Wick (RB), was provisionally identified as *M. mystacinus*. R.E.Stebbings reported that it was in fact a female *M. brandti*, 21-25 days old, and was a new county record for Somerset and a new 10 km square record for ST 55. The species had previously been recorded from only five other counties, the nearest being Wiltshire and Devon.

19. PIPISTRELLE *Pipistrellus pipistrellus*. Recorded from Glos. and Somerset, including a new 10 km square, ST 65 (JWD). A breeding colony was discovered in a church in Somerset, young being found dead on July 5 and 12 (RGS).

24. FOX *Vulpes vulpes*. Fifty foxes were said to have been shot in the Gordano valley in 1972 (JFB). In 1973, cubs were reported on May 8 (HRH), May 8 and 17 (HS), May 18 "about 8 weeks old" (AFJ), June 5 (RFH), July 23 "about ¾ grown" (HRH), and Aug.15 "well grown" (EJL). RSPCA officials reported that fox cubs were being offered for sale at £22 each. Dr. & Mrs.T.N.P.Wilton, Miss C.J. Haskins and Mr.A.F.Jayne separately sent very detailed accounts of their observations on foxes, the latter including a description of how a pair disturbed whilst mating on Jan.24 managed to jump over a wall whilst still "knotted". The 1973 Fox Rally resulted in 22 sightings, considered to be at least 13 individuals, including four sightings of pairs.

27. STOAT *Mustela erminea*. New 10 km square records were from ST 54 (EJL), ST 67 (RFH) and ST 68 (AFJ). A keeper on a Somerset estate was reported to be paid 50p each for stoat bodies.

28. WEASEL *Mustela nivalis*. New 10 km square records for ST 24 (PJC) and ST 54 (EJL).

30. AMERICAN MINK *Mustela vison*. Mink in Somerset were claimed to be "increasing at an alarming rate" (CG) and this was thought to be the "direct result of the withdrawal of the official trappers" (NSM). 6 mink were said to have been killed in the Gordano valley, the first records for that area.

31. BADGER *Meles meles*. Amongst reports of road casualties were eight killed in nine months on a 3-mile stretch of the A369 Bristol to Portishead road. Many reports of new setts and of successful badger watches were received. Three cubs were seen at each of two setts, on July 3 and Sept.5 (AFJ). Erythristic badgers, where "red" hair replaced black, were reported from a Somerset sett (CS). The incidence of bovine tuberculosis in badgers in south Gloucestershire continued to be investigated by M.A.F.F. officials, and was a subject of much concern to farmers and conservationists.

32. OTTER *Lutra lutra*. Recorded only from Somerset. The Mammal Society launched a new Otter Survey in 1973.

45. ROE-DEER *Capreolus capreolus*. Recorded from two areas of Somerset (RMC and TAMN).

53. BROWN HARE *Lepus capensis*. New 10 km square record from ST 65, Somerset (MEK).

55. RABBIT *Oryctolagus cuniculus.* Reported as "numerous" at Newton St. Loe (MJ) and Winterbourne (AFJ); 93 were seen in a field in the Gordano valley (RGS).

57. GREY SQUIRREL *Sciurus carolinensis.* Amongst many reports were some of squirrels visiting nut baskets put out for birds (REP, TMH). The Grey Squirrel (Warfarin) Order 1973 permitted the use of a warfarin bait if, when used outdoors, it was laid in a specified form of bait container.

59. DORMOUSE *Muscardinus avellanarius.* New 10 km square records for ST 44 (DS, SH, RGS) and ST 78 (AFJ, RS). Four nests were found in three localities and a hibernating dormouse was found on Jan.14 at the base of a hawthorn tree in a coppice.. It was kept in captivity until the Spring when it was released where found (RS).

61. HARVEST MOUSE *Micromys minutus.* Great efforts were put into finding nests, resulting in records from 30 new localities. A nest found near Cirencester (SH) was the first Gloucestershire record for over 100 years, and one found at Magor was a new county record for Monmouthshire (RGS). New 10 km square records were from ST 48 (RGS), ST 54 (SH), ST 58 (PD), ST 66 (EJL), ST 67 and ST 68 (AFJ), ST 75 (EJL), ST 77, ST 78 and SP 00 (SH). Two live young were found in a freshly-constructed nest on Oct.21 (RGS) and a skull was found in a milk bottle (JB). Members of Trusts and of other societies joined us for a 'training' meeting conducted by Stephen Harris who is organising the Mammal Society's Harvest Mouse Survey.

62. WOOD MOUSE *Apodemus sylvaticus.* Trapped in six localities in Gloucestershire and Somerset.

63. YELLOW-NECKED MOUSE *Apodemus flavicollis.* A new 10 km square record from 1965 was received for ST 47 Somerset (BB).

64. HOUSE MOUSE *Mus musculus.* Only one record received, from Bristol (FB).

65. SHIP RAT *Rattus rattus.* Adults and young trapped alive and poisoned in buildings in Clifton and Avonmouth. Greaves et al. (1973) reported that all of nine ship rats from Bristol tested for resistance to the anticoagulant poison warfarin were found to be susceptible. They showed that 50% of those tested from Liverpool were resistant and believed that to be the first recorded instance of resistance by *R. rattus* to a rodenticide.

66. COMMON RAT *Rattus norvegicus*. Recorded from 11 localities.

67. BANK VOLE *Clethrionomys glareolus*. New 10 km square record for ST 69 (EJL).

68. WATER VOLE *Arvicola terrestris*. Records from six new localities included one seen to be caught by a heron (AFJ).

69. FIELD VOLE *Microtus agrestis*. Recorded from five localities only.

25 species of mammals were recorded in the Bristol district in 1973; two reports of sightings of coypus (*Myocastor coypus*) could not be confirmed (MAFF). The Mammal Society plans to continue its distribution survey until 1975. If the present obvious enthusiasm and interest is maintained by the Section, the Bristol district should be amongst the most completely recorded in the country.

REFERENCES

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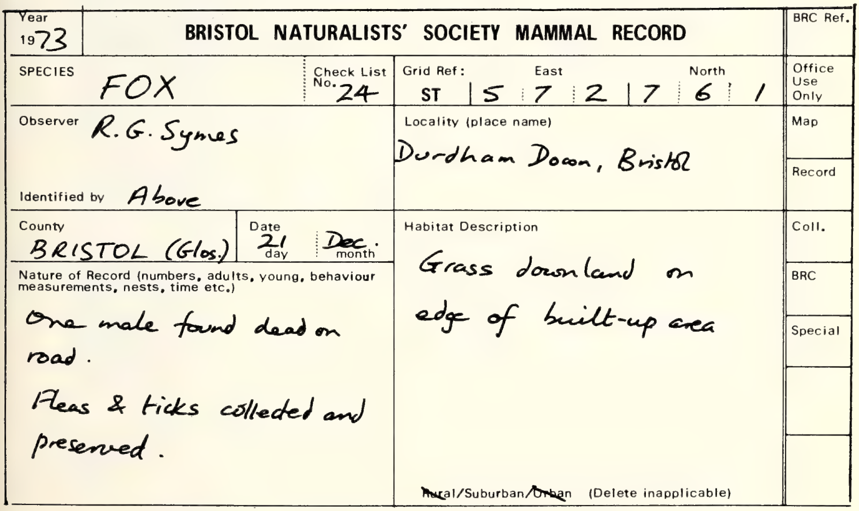

Year 1973

BRISTOL NATURALISTS' SOCIETY MAMMAL RECORD

BRC Ref.

SPECIES FOX

Check List No. 24

Grid Ref: ST East 5 7 2 North 7 6 1

Office Use Only

Observer R. G. Symes

Identified by Above

Locality (place name) Durdham Down, Bristol

Map

Record

County BRISTOL (Glos.)

Date 21 day Dec. month

Habitat Description Grass downland on edge of built-up area

Coll.

BRC

Special

Nature of Record (numbers, adults, young, behaviour measurements, nests, time etc.)

One male found dead on road.

Fleas & ticks collected and preserved.

~~Rural~~/Suburban/~~Urban~~ (Delete inapplicable)

Example of a completed Mammal Record Card

PHOTOGRAPHS FROM THE SOCIETY'S ARCHIVES

Three photographs by J.H.Savory:

Above	Peregrine Falcon on The Denny, June 16, 1951
Opposite	Two photographs of small passerines currently of interest (see page 38)
- *top*	Long-tailed Tit at nest, Abbots Leigh, May 21, 1934
- *bottom*	Whitethroat at nest, Abbots Leigh, July 3, 1937
Page 72	Two photographs by Mrs.M.L.Davis, of interest in connection with Dr.Carter's paper (pages 79-90):
- *top*	Erosion cliff of the salt marsh at Sheperdine, 1948
- *bottom*	Out-plantings of *Spartina townsendii* below Severn Beach, 1949

MINERALS FROM THE UPPER EVAPORITE HORIZON OF THE KEUPER MARL AT YATE

By M. T. CURTIS

INTRODUCTION

The strontium mineral celestine ($SrSO_4$) has for many years been extracted from the Keuper Marl and underlying Palaeozoic rocks around Yate (Mine and Quarry Engineering, 1960) where it occurs as irregular veins and nodules. The main productive celestine-bearing ground is restricted to an area running about 7 miles from Westerleigh in the south to just west of Wickwar in the north, the average width of the outcrop being about 1 mile. It is believed that the celestine in the Keuper Marl is the primary deposit and is to be correlated with the upper of the two Gypsum Beds which occur in the Keuper Marl (Kellaway and Welch, 1948). The underlying Palaeozoic strata dip to the west at Yate and the celestine, which occurs largely between the bedding planes, 'feathers out' with depth (Mine and Quarry Engineering, 1960) suggesting emplacement by downward percolation of meteoric waters from the overlying deposit.

Surprisingly, very little work has been done on the origin of this unique deposit. Sherlock (1938) postulated that the celestine was deposited when strontium-bearing fresh water entered a land-locked sea from the south. This sea was actively depositing gypsum but the deposition was arrested locally by the ingress of fresh water which caused the concentration of calcium sulphate to drop below saturation point. The solubility of strontium sulphate, however, is lower than that of calcium sulphate and so it is thought that celestine was deposited when the high-strontium fresh water mixed with the high-sulphate sea water. No attempt is made to explain the absence of dolomite such as might be expected to precipitate from a closed sea producing evaporites according to the closed basin model. This theory and some of the other aspects of the formation of the celestine deposits has been reviewed by Thomas (1973) in his Mineral Dossier for the Mineral Resources Consultative Committee.

DESCRIPTION OF LOCALITY

Recently the celestine horizon of the Keuper Marl has been exposed near its southern-most extremity during excavations on a building site south of Yate. As far as can be ascertained, no commercial celestine digging has been carried out on this site. The particular site of interest was contained within a rectangle of approximately 100 metres east-west by approximately 75 metres north-south, and which was centred upon grid reference ST70688068. The exposure was limited laterally because the celestine horizon was approximately 1 metre thick and was situated about 1.5 metres below the highest point of a small hill which fell off steeply to the west and north and less steeply to the east. The area to the south was obscured by a new road and piles of building materials. The close proximity of the deposit to the surface facilitated easy access during the digging of foundations and drainage systems.

DESCRIPTION OF MINERALS

The celestine occurred as boulders (or mumblers as they are known locally) which ranged in size up to 1 metre in diameter. The majority of these boulders were distributed immediately above and below a thin green intermittent bed of variegated marl which varied in thickness from 0-15 centimetres. The celestine was granular in nature and varied in colour from colourless to pale red. Occasionally the boulders contained cavities which were lined with tabular crystals of celestine up to 2 centimetres in length. The external surfaces of these nodules were founded and tended to be smooth suggesting some possible small amount of movement subsequent to deposition.

One small nodule (10 centimetres in diameter) when broken open, contained a stratiform texture. Thin layers of granular celestine varying in thickness from 1-10 millimetres were interbedded with laminae, generally less than 1 millimetre in thickness of Keuper Marl. As above the celestine was of a fine granular nature.

When one of the larger boulders was broken open, scattered around the centre were found eroded, black stained crystals up to 1 centimetre in size. A number of these crystals displayed a well formed cubic habit strongly suggestive of pseudomorphs after halite. The crystals were found by X-ray diffraction analysis to consist entirely of calcite. The presence of halite was not detected however. The celestine surrounding these pseudomorphs was very finely granular and was orange in colour whereas the majority as described above was colourless to pale red.

The most dominant feature of this deposit, however, was the high degree of silicification to which the nodules had been subjected. Most of the cavities in the nodules had been filled with coarsely crystalline quartz. Most of the outside surfaces also had quartz crystals grown on them which had grown in some cases up to 4 centimetres in length. Most of this quartz was clear in colour but a large proportion of it displayed varied degrees of amethystine colouring. This is believed to be the first time amethyst has been reported from the Yate deposits. The celestine in the more siliceous nodules was heavily eroded and much had obviously been carried away by the depositing solutions.

In a number of examples, quartz had surrounded plates of celestine during growth and in doing so had entrapped a thin veneer of red Keuper Marl between the celestine and silica. Where this had occurred fine needles were found disseminated through the quartz adjacent to this thin film. X-ray diffraction analysis showed these needles to be composed of goethite (FeO.OH). The needles were always contained within one crystal of quartz and were almost entirely arranged in small radiate groups (see Fig.1a). The point of origin of these groups was always at or very close to the quartz face which was closest to the Keuper Marl and celestine. A small proportion of the included goethite needles, however, were arranged in a random fashion (see Fig.1b), but even so, the point of origin of these crystals was at or very near to the quartz surface. Goethite needles were never found either in the centre of quartz crystals nor in crystals which were not immediately adjacent to celestine plates coated with Keuper Marl. Neither were any needles found included in amethyst.

Many of the specimens have been found to have black staining both in cavities and on external faces but, because they are so thin, these deposits have not yet been analysed.

DISCUSSION

The external nature of the celestine bounders would tend to indicate, as mentioned above, that they have been moved, possibly in an aqueous medium, subsequent to deposition. The celestine constituting these boulders is very friable due to the uncemented nature of the granules and so it seems very unlikely that the larger of the boulders at least have been moved very far from the source area. The only suggestion of any depositional history was contained in the nodule which possessed a bedded appearance which was strongly suggestive of a primary sedimentary deposit. This bedding was not, however, displayed by any more of the boulders.

The calcite pseudomorphs pose something of a problem. One can only assume that the crystals found are those which remained after the majority was removed by circulating waters. This would explain the presence of cavities in many of the boulders examined. Those which were found were all in the centre of a large boulder where there was little evidence of exsolution by circulating waters. If these cubes are truly pseudomorphs

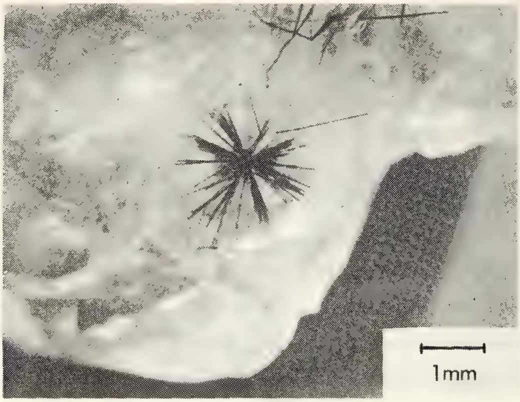

Fig. 1a Radiate inclusions of goethite in quartz

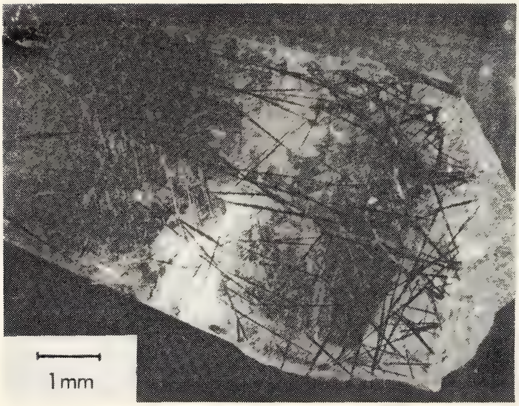

Fig. 1b Random inclusions of goethite in quartz

after halite then their presence would tend to suggest a possible sabkha type origin for the celestine and gypsum deposits. It has been pointed out by Shearman (1966) that celestine is a minor but common accessory mineral in sabkha deposits and also that halite is commonly found as cubes disseminated through the sediment. The halite is derived from saturated brines which form the greater part of the groundwaters found in these environments. But the normal sabkha model as typified by the present deposits of the Trucial Coast does not explain the high concentration of celestine such as is found at Yate.

The siliceous deposits may now be considered. They were probably derived after the celestine. As has already been discussed, the boulders were fairly well rounded, but the quartz crystals show no signs of abrasion or brecciation where they appear on the outside of the boulders. They were, therefore, grown in much the same position as they are now found.

The question now arises as to whether the quartz was deposited by circulating meteoric waters or juvenile waters from below. The present author tends to believe that juvenile waters are responsible since some evidence has been found to suggest that zinc mineralisation has occurred in the celestine-bearing beds of Keuper age (Curtis, Unpublished results). Specimens of celestine have been found in Keuper Marl and deposited on the celestine were secondary growths of calcite which contained small crystallites of sphalerite. Unfortunately, the exact origin of this material is unknown as yet so a more detailed study of this material must await this information. Furthermore, amethyst of a sedimentary origin is virtually unknown (Frondel, 1962). In fact, only one possible example of sedimentary amethyst is cited in the above work and even that is not described in detail and may itself have been deposited in juvenile waters. It does not seem unreasonable to suppose, therefore, that juvenile waters were the depositing medium and that passage through the Keuper Marl and underlying Coal Measures resulted in an enrichment of silica and iron. The iron is a necessary minor constituent of quartz for the amethystine variety to form (Barry and Moore, 1964).

It is postulated that the goethite needles found included in the quartz were grown after the deposition of the quartz. If the needles were grown before this deposition then one would expect to find needles which were included in two adjacent crystals and this is not the case. Furthermore, if the goethite had been grown prior to the deposition of quartz and had subsequently been included, then one would also expect some extraneous matter, e.g. Keuper Marl to have been included in the quartz and none has yet been found in any of the crystals. It is believed that the iron ions were derived from the haematite contained in the Keuper Marl which was entrapped at the quartz/celestine boundary and then diffused into the quartz. White (1970) showed that alkali metal ions may diffuse through the quartz lattice and since the ionic radius of the ferric ion is small by comparison (0.64Å), it is likely that diffusion occurs for this ion also. When the iron diffused into the quartz lattice it then reacted with hydroxyl ions which are normally present in quartz (Frondel, 1962). The diffusion of the hydroxyl ion in the quartz lattice has been demonstrated by White (1971). This type of mechanism is supported by the apparent point source origin of the included needles which in all probability coincides with a grain of Keuper Marl which served as a source of iron. The driving force for such a process is not immediately obvious, but it may well have been the small piezoelectric potentials which would have been generated in the quartz upon deep burial.

CONCLUSIONS

The mineral assemblage contained in the southernmost extremity of the Yate celestine deposits has been investigated. Most of the celestine boulders found there were probably moved to their present position subsequent to deposition and they do seem to contain some possible evidence for a sabkha-type origin for these deposits. The highly siliceous nature of the celestine is believed to be attributable to the circulation of juvenile waters through the deposit. Goethite found included in this quartz is believed to have been derived from iron which diffused into the quartz from the Keuper Marl.

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THE DEVELOPMENT AND MORPHOLOGY OF THE *SPARTINA* MARSHES OF NORTH SOMERSET (SOUTH AVON)

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INTRODUCTION

The salt marshes along the Avon and Somerset coasts of the Bristol Channel are largely dominated by the cord grass *Spartina townsendii* (sensu lato) hereafter called *Spartina*. The marshes of Bridgwater Bay have been intensively investigated by Ranwell (1961; 1964a; 1964b), and those near Aust by Large (1967). This present study examines features of the marshes between Woodspring and Portishead. The coast between the River Yeo and the River Kenn is particularly interesting because the early development of this marsh was recorded by Roper (1918; 1919a; 1919b; 1921; 1922). Also of considerable interest is the response of salt marsh development and morphology to the extreme variations in tidal and suspended sediment concentrations, experienced in the local coastal area.

In many areas *Spartina* marshes have been planted and encouraged, both as a possible means of coastal protection and for various economic reasons (Ranwell, 1967). Hubbard and Stebbings (1967) estimate that more than 12,000 hectares of *Spartina* marsh exist on the British coast. These marshes were largely planted before 1935 (Goodman *et al*, 1959) and now form mature swards (or meadows). In several localities salt marshes appear to be in a recessional phase (q.v. Goodman *et al* 1959; Marshall 1962; Greensmith and Tucker, 1965), which is ascribed to a variety of possible causes. These factors were considered during the interpretation of the present data.

STUDY AREA

The study area extended from Woodhill Bay, Portishead, to the mouth of the River Banwell, Woodspring, and is shown in Figure 1. Marsh development is not continuous along this coast, but is largely coincident with the lower alluvial shorelines. *Spartina* tends to colonise the intertidal zone, which consists predominantly of mud (particle size <0·06 mm) with some sand (2.0 to 0·06 mm), although the latter is usually present at the upper and lower limits of the zone. The tidal range of the coast varies between 6·7 metres at Neaps and 12·2 metres at Springs.

RESULTS AND DISCUSSION

Woodspring to Wains Hill, Clevedon

i) *Development* The planting of *Spartina*, about 1913[1], was recorded by Roper (1918; 1919a) in two distinct areas between the River Yeo and the River Kenn. The approximate area of plantings is shown in Figure 2. These plantings were presumably made in an attempt to reclaim the foreshore and lessen the risk of flooding at high spring tides. In subsequent papers Roper (1921, 1922) monitors the spread of the planted *Spartina*. The eastern planting near the River Kenn had extended considerably by 1920, while the western or River Yeo planting had failed to become well established, although a few plants remained.

It is believed (D.Lilley, pers. comm.) that further plantings occurred between 1920 and 1924, in the area between the River Kenn and Wains Hill, although no documentary records were traced.

Air photographs for 1946 show (Figure 2) the *Spartina* marsh to have extended along most of the shoreline from the River Yeo to Wain's Hill. The original 1913 planting near the River Kenn remains only as a short 'fringing' marsh to the higher saltings. The relatively sheltered Clevedon Pill was well covered by *Spartina* meadow.

A survey of the area was undertaken in 1967 by the author. This survey employed simple survey techniques - compass traversing, Abney level profiling, and taping - and consequently only gross changes from those shown on the 1946 photographs can be deduced. Overall the *Spartina* appears to have continued its expansion, many of the gaps in the 1946 sward having been infilled by 1967 - particularly between the Blackstone Rocks and the River Kenn. The landward edge of *Spartina* marsh at Clevedon Pill was showing successional invasion of higher salt marsh plants, notably *Scirpus maritimus*, *Puccinellia maritima* and *Aster tripolium*.

The extent of *Spartina* marsh in 1967 between the River Yeo and the River Banwell is shown on Figure 3. The spatial development of this marsh is not known, but it is likely some planting occurred here. The building of the sea wall during the 1950's might have disturbed the landward margins of an older marsh.

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[1] Hubbard and Stebbings (1967, p5) give this date incorrectly as 1919.

ii) *Morphology* The salt marshes display a wide diversity of both erosional and depositional features. This diversity may be due either to the alongshore spread of the marsh, or to the variations in environmental control factors such as foreshore slope, sediment distribution or aspect.

In those areas where the marsh still appears to be extending to the bare mud foreshore, it can be seen to be advancing in two distinct ways. Firstly this is by discrete clumps of *Spartina* which eventually coalesce to form a continuous sward, a common colonisation pattern which has been described by many authors (q.v. Caldwell, 1957; Hubbard, 1965). Secondly, extension is by linear spread seawards, along the edges of drainage creeks. Ranwell (1964b) notes similar features in Bridgwater Bay. This type of spread is probably due to tidal current velocities over a steeper foreshore slope. Linear spreading patterns appear to occur where slope is more than 4°. (The clumping patterns occur on slopes between 0° 20' and 1° 30'.) Both types of colonisation pattern can be seen between the River Yeo and the River Banwell.

Where a cliff occurs at the seaward edge of the *Spartina* marsh, it appears at first to indicate a situation in which the marsh is eroding. However this cliff could be due to depositional effects, particularly if the seaward extension of the marsh has become neglible.

The margin of the *Spartina* would become raised by accretion around the base of the plants. Once a height difference between the marsh and the intertidal mud had been established, a cliff would form. This cliff would naturally act as a focus for tidal and wave action, and subsequently assume an erosion-type profile. The presence of depositional cliffs is further suggested by the occurrence of two *landward*-facing cliffs on the marsh at Wick Wharf. These are shown on the levelled profile (a) on figure 4. These cliff forms must be due to deposition effects, probably accentuated by ebb-tide scouring processes. Near the Blackstone Rocks a series of parallel creeks and marsh strips can be seen. It is regarded that these are due to tidal movements around the rocks contributing to enhanced water velocities and suspended sediment concentrations, sufficient to both maintain the creeks and build up the intervening marshes.

The original 1913 plantings near the River Kenn are shown on Figure 4, profiles (b) and (c). The width of *Spartina* marsh is about 30 metres, and terminates to the seaward in a cliff. The marsh is crossed by numerous small creeks, particularly where the sea wall forms the landward margin. These features are probably both depositional and erosional in origin. The cliffs appear to contribute clods of *Spartina* to the lower intertidal mud area serving for future marsh extension. It is interesting to observe that the *Spartina*, at this point, seems to have little effect on the erosion of the saltings. The erosion cliff of the saltings appears to be a very active feature.

PORTISHEAD

The *Spartina* marsh here is contained within the continuous Woodhill and Kilkenny Bays. There is no evidence to suggest when this marsh was established, but it is known to have been a mature sward by 1950.

The marsh was surveyed using a plane table, and detail was added by taping. The results of this survey are shown in Figure 5. The vegetation is almost exclusively *Spartina*, but in places, particularly Woodhill Bay, this appears degenerate and covered with algae. This degeneration is possibly due to human trampling of the sward. Occasional plants of *Scirpus maritimus* were noted, at the landward margin of the *Spartina*, and it is likely these will increase in the manner described by Ranwell (1964b).

By use of a method similar to that described by Morley (1973) the tidal immersion of the *Spartina* was investigated. The maximum submergence of the outer (lower) *Spartina*, during spring high tides (11·3 metres range), was calculated to be between 220 and 270 minutes (depending upon wind set-up of tides), while submergence during ordinary high tides (9·1 metres range) was between 140 and 180 minutes. About 50 tides per year will reach the landward margin of the marsh. These immersion periods agree closely with those suggested for Bridgwater Bay by Morley (1973), but are much lower than immersion durations calculated for Poole Harbour (Ranwell *et al* 1964, Hubbard, 1969).

The marsh shows a dendritic drainage pattern, but this is confused at the lower margins of the sward by diverging as well as converging channels. This must be due to the two-way flow experienced during the ebb and flood of the tide. The establishment of specific drainage patterns is probably due to physical factors - for example, foreshore slopes, tidal velocities. Pestrong (1965) deals intensively with such processes.

The Woodhill Bay sward (north-eastern) shows some features of an 'eroding' marsh. The profile(d) (Figure 4) shows numerous creeks, usually exhibiting bank slumping and also an isolated 'island' of *Spartina* seaward of the main sward. This island could be the depositional expression of a non-expanding clump, or it could be the remnant of an older, now substantially eroded, outer marsh. It is suggested that the former is more likely, for two reasons: (i) because the island has remained for at least 10 years (1963-1973) without visible signs of erosion; (ii) every similar island appears to be in the same morphological condition, no ergodic sequence of erosion being shown by such islands.

The south-western or Kilkenny Bay sward is extending westwards, by clump colonisation. These clumps appear to be establishing themselves on rocky/sandy foreshores, and then trapping mud around the roots. They are therefore altering the sedimentological regime of the Bay. The *Spartina* appears to be extending around the open sewer (shown on Figure 5), possibly due to shelter effects from wave action, and also an increased nutrient supply from sewerage.

CONCLUSIONS

The salt marshes show a wide variety of morphology. In the area between the mouth of the River Yeo and Wain's Hill, *Spartina* is still extending seaward, although some replacement of this by other species is occurring at the landward margins. There is no real evidence of erosion, although the marsh exhibits morphological features which suggest it. Such erosional facets may be due to deposition on a slowly extending seaward *Spartina* margin. These areas are obviously more susceptible to any erosional processes which might occur. It is possible that a cyclic sequence of marsh erosion and deposition (such as that suggested by Greensmith and Tucker, 1966) might occur, but there is little confirmatory evidence.

The tidal immersion periods at Kilkenny Bay and Woodspring Bay suggest that the marsh is still capable of seaward extension, towards the immersion limits suggested by Ranwell *et al* (1964). However, there may be peculiar limiting phenomena - wave action, tidal current velocities - in this area which inhibit extension of the vegetated marsh. To judge from the relative heights below high water mark (shown on Figure 4) the River Kenn swards could extend considerably further seaward, while the Wick Wharf sward has extended as far seaward as the Portishead sward.

ACKNOWLEDGEMENTS

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The following figures show, respectively:

Fig.1 The study area of the South Avon coast.

Fig.2 Extension of *Spartina* marsh between 1913 and 1967, between Wain's Hill at Clevedon and the mouth of the R. Yeo.

Fig.3 Extent of the *Spartina* marsh at Wick Wharf in 1967.

Fig.4 Typical cross-sections of the *Spartina* marshes.

Fig.5 Extent of *Spartina* marsh within Woodhill and Kilkenny Bays, Portishead, taken from a plane table survey made in August 1967.

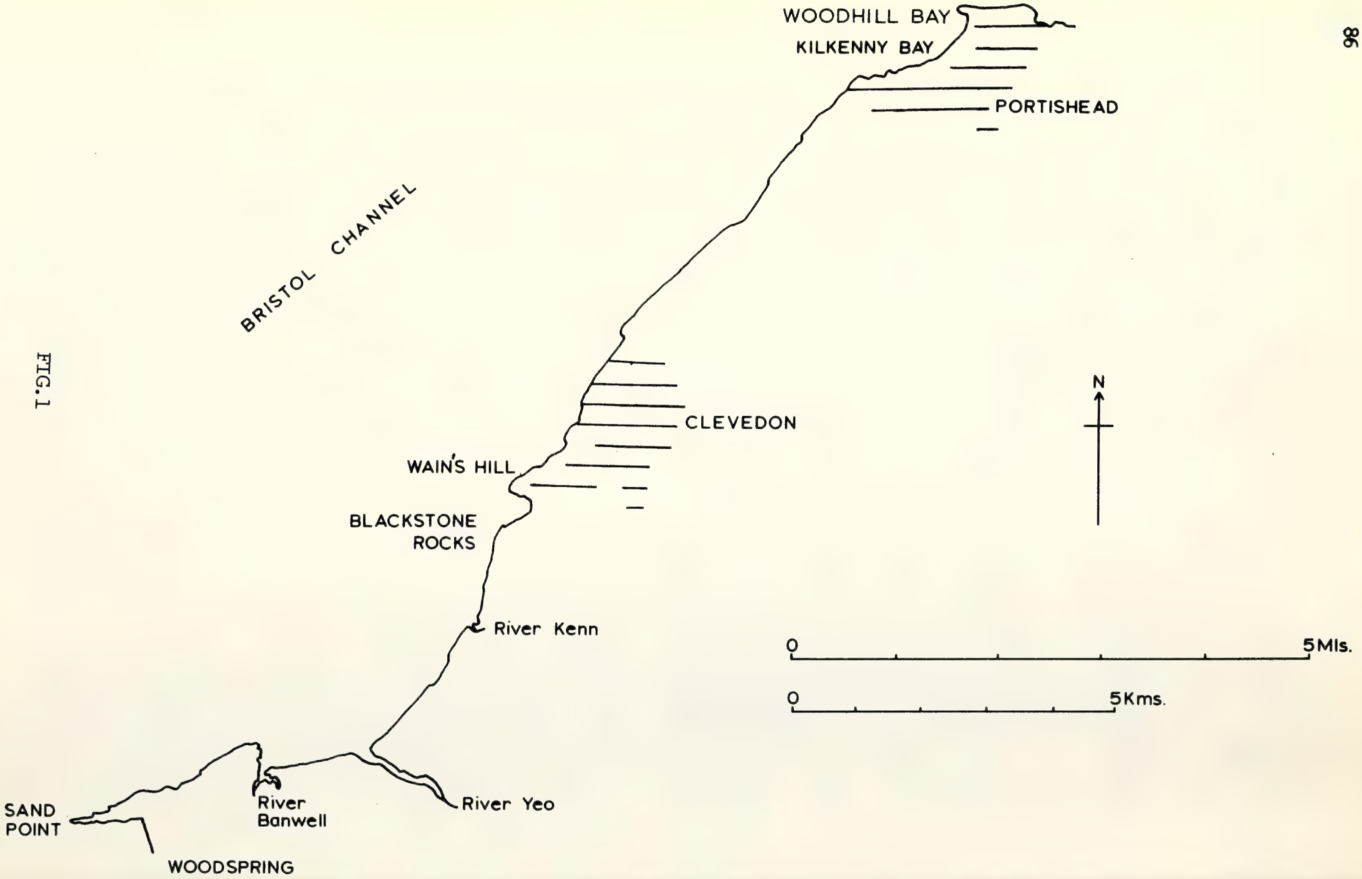
WOODHILL BAY
KILKENNY BAY
PORTISHEAD
BRISTOL CHANNEL
CLEVEDON
WAIN'S HILL
BLACKSTONE ROCKS
N
River Kenn
0
5Mls.
0
5Kms.
SAND POINT
River Banwell
River Yeo
WOODSPRING

FIG.1

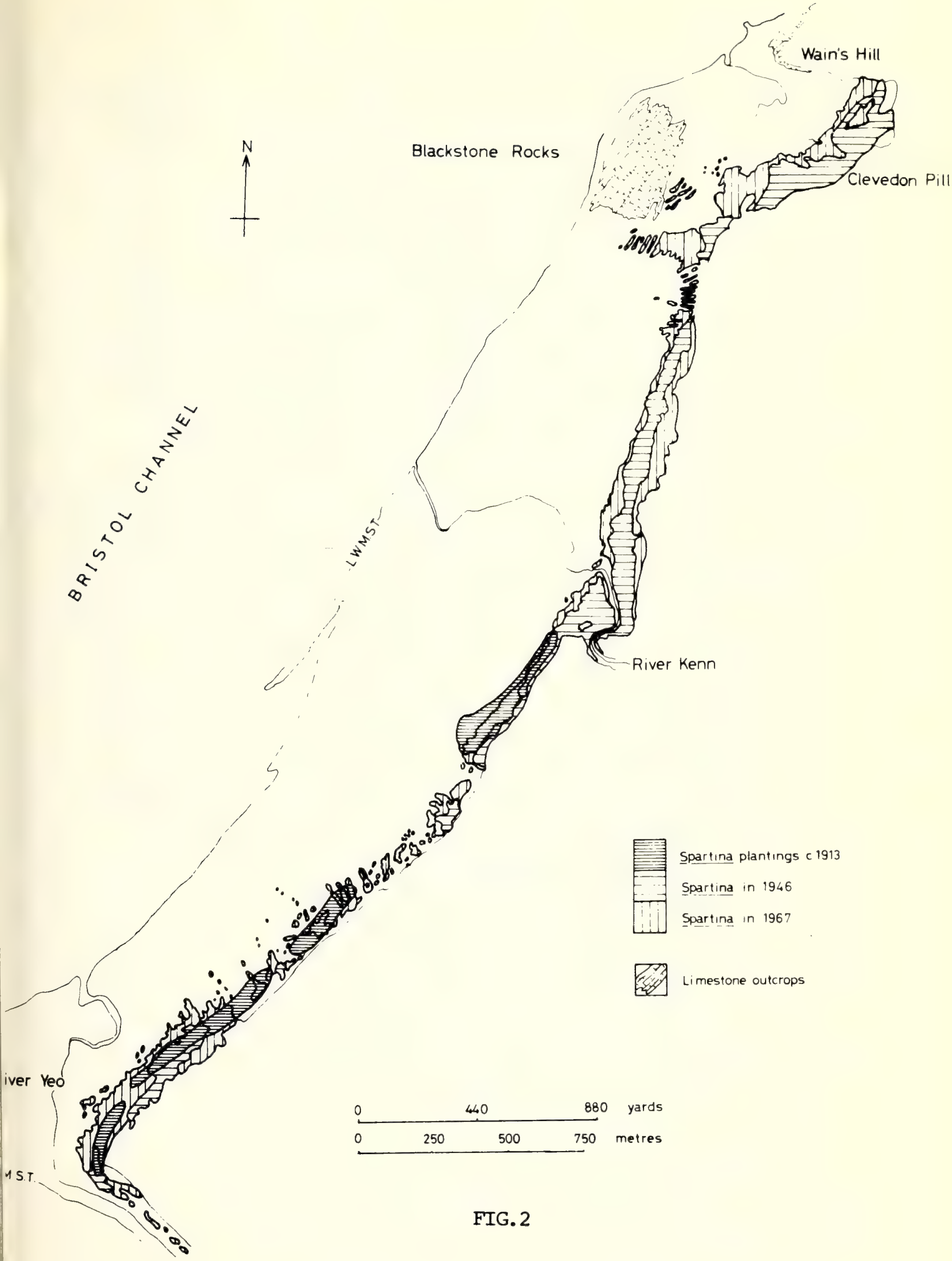
Wain's Hill
N
Blackstone Rocks
Clevedon Pill
BRISTOL CHANNEL
LWMST
River Kenn
Spartina plantings c 1913
Spartina in 1946
Spartina in 1967
Limestone outcrops
iver Yeo
0
440
880
yards
0
250
500
750
metres
M S.T.

FIG. 2

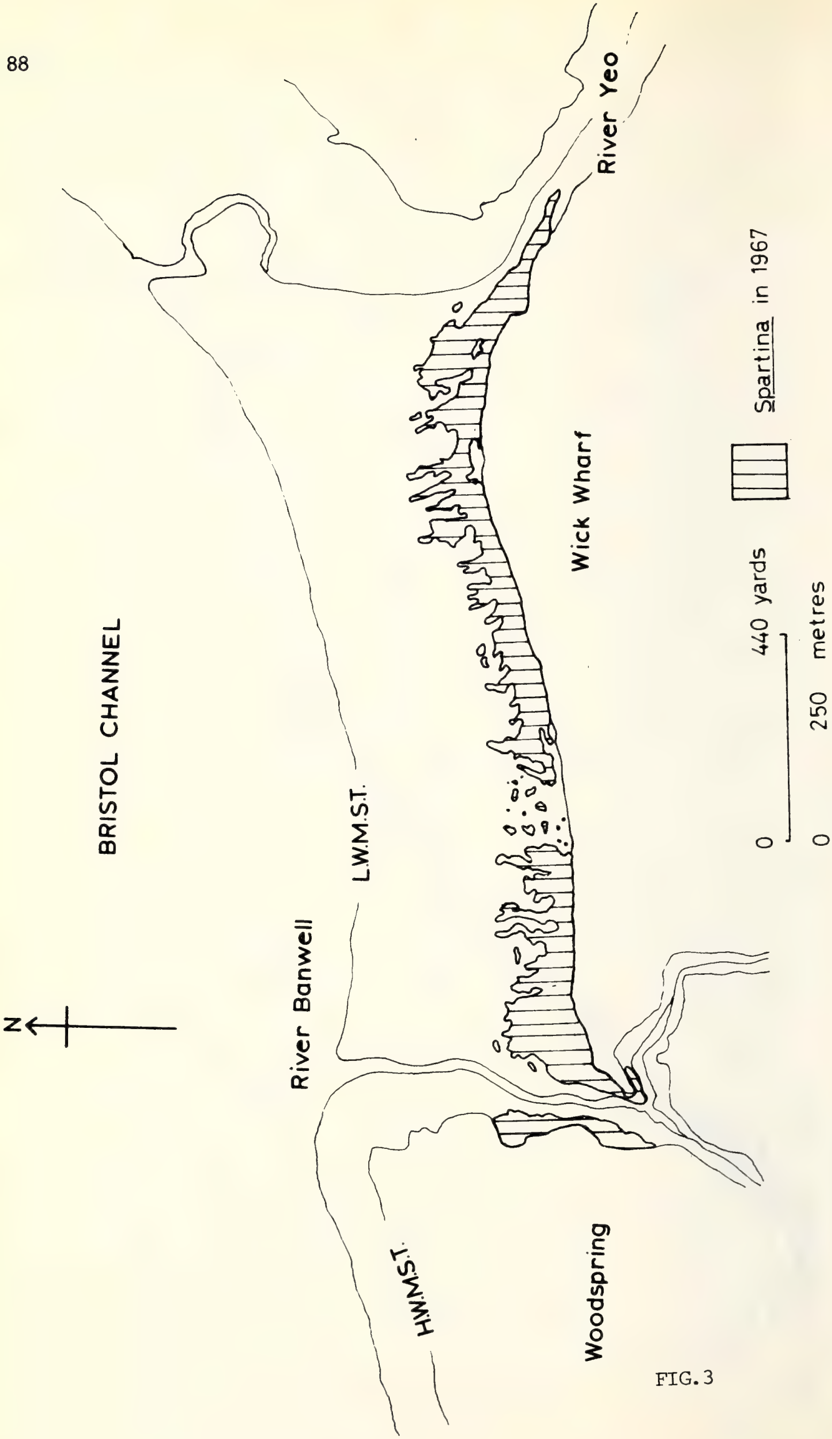
BRISTOL CHANNEL
L.W.M.S.T.
River Banwell
N
River Yeo
Wick Wharf
Spartina in 1967
0
440 yards
0
250
metres
H.W.M.S.T.
Woodspring

FIG.3

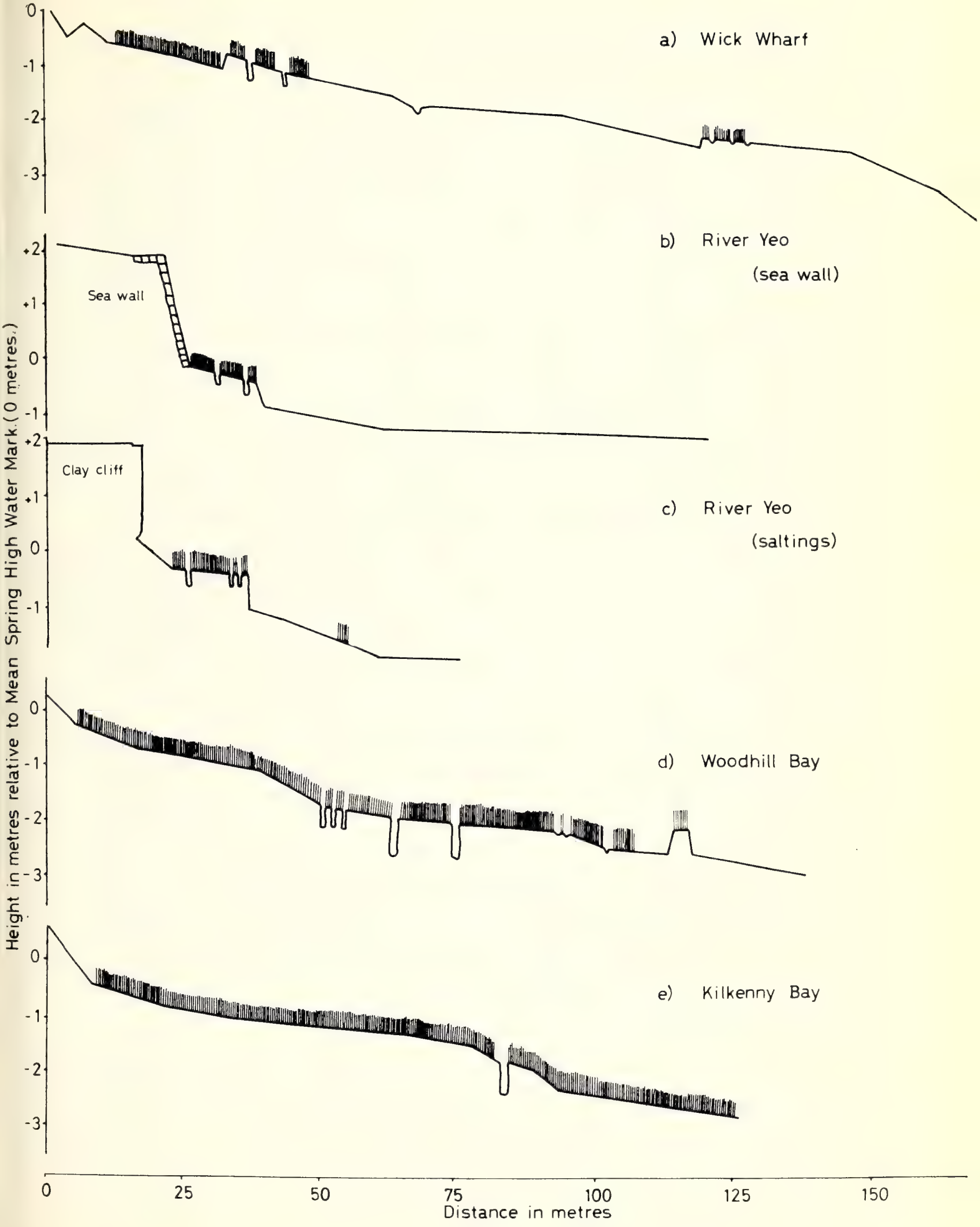
a) Wick Wharf
b) River Yeo
(sea wall)
Sea wall
c) River Yeo
(saltings)
Clay cliff
d) Woodhill Bay
e) Kilkenny Bay
Height in metres relative to Mean Spring High Water Mark (0 metres.)
0
-1
-2
-3
+2
+1
0
-1
+2
+1
0
-1
0
-1
-2
-3
0
-1
-2
-3
0
25
50
75
100
125
150
Distance in metres

FIG. 4

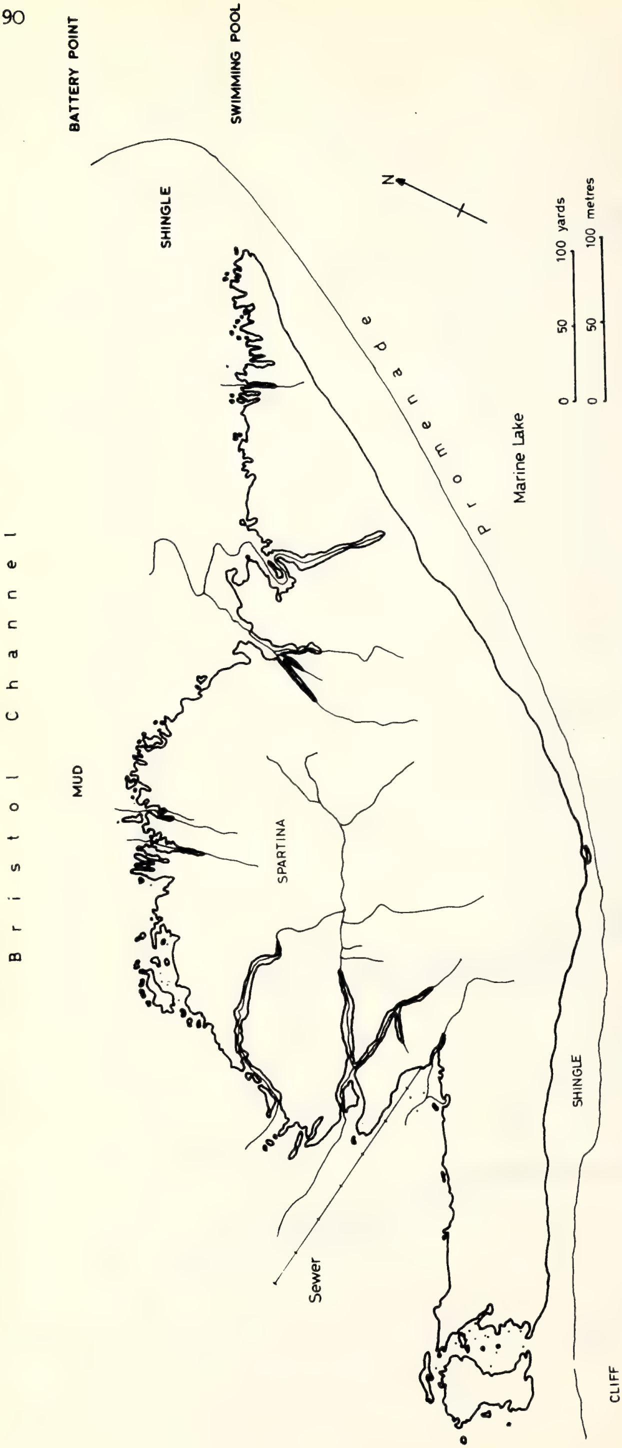
Bristol Channel
BATTERY POINT
SWIMMING POOL
SHINGLE
N
0 50 100 yards
0 50 100 metres
Promenade
Marine Lake
MUD
SPARTINA
Sewer
SHINGLE
CLIFF

FIG.5

TEMPORARY DRIFT EXPOSURES ON THE FAILAND RIDGE

By

G.J.Colborne, D.D.Gilbertson & A.B.Hawkins

The evidence supporting the concept of the glaciation of north Somerset has been described by Hawkins and Kellaway (1971) and Hawkins (1972). These authors draw attention to the presence of glaciogenic deposits south of Clevedon and on the western end of the Failand Ridge, including the East Clevedon Gap, the Court Hill Col and Tickenham Hill Col. The main erratics of the till and glacio-fluvial gravels at Kenn (ST 4269) are Chalk flints and Greensand chert. These are often the principal components of the remanié drift noted by Davies and Fry (1929) occurring at many places on the hills both east and west of Bristol. These deposits have been interpreted as the remnants of a former high level river system (Lacaille, 1970). It now seems increasingly probable that much of these high level drifts may be relics of glacial origin.

At Leigh Woods, Davies and Fry (1929) describe a flint and chert gravel at a height of 250 ft. (76 m.) O.D. Near Stokeleigh Camp and Black Rock Quarry (Sea Walls), on either side of the Avon Gorge, they refer to 'rolled, river-worn flints' at a height of 250-300 ft. (76-92 m.) O.D. In Leigh Woods, Hawkins and Kellaway (1971) report "patches of structureless clay with flint and chert fragments...." Some of these have been recorded by the Institute of Geological Sciences on Sheet ST 57 SE as either "Loamy soil with fragments of flint or chert", or as patches of Head.

In July 1970, a temporary excavation in the gardens at Denegarth, Leigh Woods (ST 558730) provided an exposure of drift deposits. The following section at about 340 ft. (104 m.) O.D. overlying Clifton Down Limestone was noted by D.D.Gilbertson, Fig.1 and Photo 1.

Unit	*Thickness*	*Description*
1	0.45 m.	Poorly bedded, angular fragments of red stained Carboniferous Limestone (<0.3 m. long) in a red brown sandy loam matrix.
2	0.30 m to 0.72 m.	Firm red brown clay containing some angular and some rounded cobbles and boulders of Carboniferous Limestone, affected by cryoturbation. In south-west corner of the pit boulders dip due north, following the surface slope.
3	0 to 0.30 m.	Grey sandy clay containing small angular fragments of Carboniferous Limestone occurring in hollows.

4	0 to 0.61 m.	Very stiff red sandy clay with rounded boulders (<0.3 m. long).
5a	0 to 0.30 m.	Greyish-yellow silty sand merging downwards with
5b	0 to 0.30 m.	Yellow sand with angular cobbles occurring in a large wedge shaped gap between bedding planes in Carboniferous Limestone, which close at 1.8 m. in the south-east corner.
		The *in situ* Carboniferous Limestone is heavily jointed; the joints infilled with red sandy loam.

Unit 1 is a coarse angular head resulting from a period of intense frost shattering, probably during the Weichselian (Devensian-Last Glaciation). The poor quasi-bedding is undoubtedly due to downslope sliding during the periglacial conditions. The red brown sandy loam which comprises the fine matrix of the head is very similar to the coversand recognised at Kenn (Gilbertson and Hawkins, in press) and the sandy horizons in the periglacial breccia deposits at Holly Lane, Clevedon described as aeolian by Greenly (1922) and Palmer (1934), supported by Gilbertson and Hawkins (1974). These loamy sands are widespread in North Somerset, already having been recorded on Middle Hope, Worlebury, Brean Down and the Mendips (Findlay 1965). In the latter case Findlay states, "Particle-size and mineralogical investigations similar to those made by Perrin (1956) and Smithson (1953) provide substantial evidence for the accumulation of wind-blown silt of loessial character on the Plateau". The clays and sands containing boulders (Units 2-4) closely resemble much of the till examined recently in the Kenn area, except that at Denegarth the main clast constituent was limestone, and no erratics were found.

The overall nature of the Leigh Woods deposits is similar to the red/brown and yellow clayey sandy silts with occasional Chalk flints and Greensand cherts which have been observed both overlying and occurring within fissures and solution hollows in the Clifton Down Limestone at Providence Quarry. Visits to this quarry over the last five years have shown a number of infilled hollows. Although considerable quantities have been washed no fauna has been recovered. It is probable that at both Denegarth and Providence the drift has suffered some hillwash or solifluction movement, but they are different from Unit 1 at Denegarth, which is recognisably a solifluction deposit.

During 1973 temporary works at the road junction at Beggars Bush (ST 552731) on the Goblin Combe Oolite showed clayey silts and unconsolidated sands within the limestone. Unfortunately the excavations

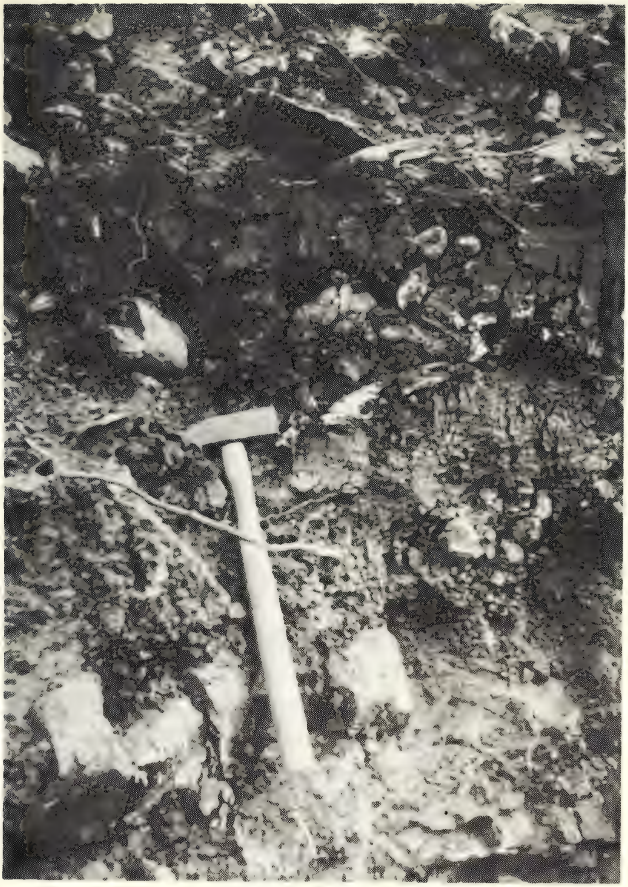

PHOTO 1

Exposure at Denegarth

were insufficient to be precise about the relationship of the drift to the bedrock, but the drift appeared again to be in solution hollows. Here, as at Providence Quarry, sieve washing failed to produce any fossil evidence as to the age of the deposit.

Westwards along the Failand Ridge, in order to release standing water on the Bristol-Clevedon (B3128) roadside, a soak-away pit was dug in 1971 in the hollow south of Moat House Farm (ST 487727) Fig.2. Although the geological map (ST 47) shows the area as Black Rock Dolomite the excavation proved in excess of 14 ft. (4.3 m.) of firm reddish brown silty clay with much manganese staining along the fissures and with some gravel and cobble clast of Greensand chert and iron nodules. Unfortunately this pit was being backfilled when visited. An electrical resistivity investigation undertaken by F.W.Richards suggested that the general crop of the silty clay followed the trend of the Black Rock Dolomite; although it was frequently wider than the outcrop shown on the geological map. The recent M5 Clevedon Hill excavations indicated that the Black Rock Dolomite is frequently very weathered and in some cases breaking down into a sandy soil near the discontinuities. It is possible therefore that the roadside exposure may represent a weathered surface deposit of the Black Rock Dolomite. As the deposit was not seen to contain anything diagnostic it may also be argued that the faster weathering of the dolomite horizon led to selective erosion, producing a hollow which now contains a relic glacial deposit.

Recently another deposit 9½ ft. (2.9 m.) thick has been located by G.J.Colborne during pedological studies east of Moat House Farm, ST 491729 (Fig.2).

A summary description of this outcrop on the Black Rock Limestone is given below:

Unit	*Thickness*	*Description*
1	0.25 m.	Top soil.
2	0.14 m.	Brown to reddish brown non-calcareous silty clay loam to silty clay. Strong medium angular blocky structure. Slightly stony with gravel sized rounded quartz and sub-angular Greensand chert pebbles plus some greyish sandstone cobbles and rare blocks of weathered dolomitic limestone.

3	0.91 m.	Brown to yellow/red very weakly calcareous silty clay with heavy manganese staining. Prismatic structure frequently with a secondary clay on fissures. Slightly stony with small highly patinated cherts showing both sub rounded and angular faces, located mainly in pockets but with no preferred orientation within the pocket or of the pockets; few medium gravel sized rounded siliceous sandstone pebbles.
4	0.98 m.	(From 1.6 m down description from Jarrett auger samples) Similar to above except the chert content appears to get less. On west wide of the pit boulders of weathered dolomitised crinoidal limestone.
5	0.05 m.	Indurated, discontinuous, cavernous multi-layered iron pan.
6	0.57 m.	Variously coloured, manganese stained, very weakly calcareous stoneless clay. Crinoid stem and Zaphrentis seen. The auger could not penetrate further - the auger base indicating either a limestone bedrock or boulder.

The position of these two outcrops at over 400 ft. (122 m.) O.D. near Moat House Farm is interesting in that the exposures occur within two miles of the deposits described by Hawkins (1972). Prior to the finding of these deposits, the steep sided nature of the Caswell valley (Fig.2), with no apparent structural or lithological explanation, suggested a possible melt water feature. The finding of the Moat House Farm deposits, without yet checking their complete nature and extent, suggests that they may well be relic glacial material, the ice coming to the top of the Failand Ridge either from the immediate south or up the Tickenham Valley.

The textural properties of the drift deposits described are not compatible with a "normal" fluvial origin. The lack of sorting, wide range of particle sizes present, and frequent presence of erratics suggest these drifts may represent relict patches of glacial till.

Understanding of the glacial events in Avon County will only come by people recording significant exposures when they become available. Members of the Society are urged by the authors to record and report anything they consider of possible glacial origin so that in the future a complete assessment of the evidence can be made.

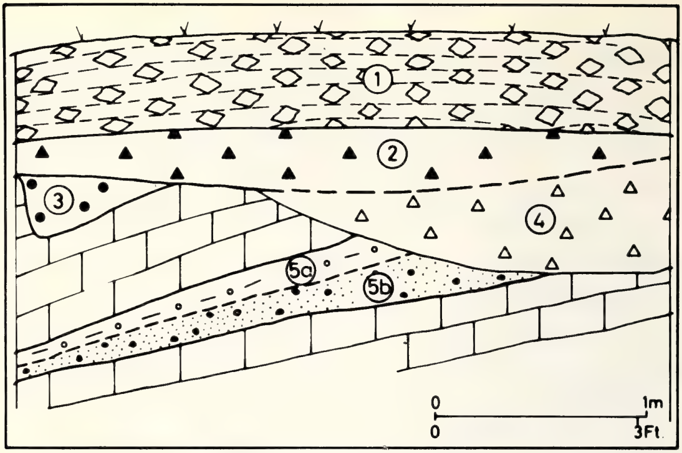
①
②
③
④
5a
5b
0
1m
0
3Ft.

Fig.1. Exposure at Denegarth, Leigh Woods (ST 558730). Unit numbers referred to in text

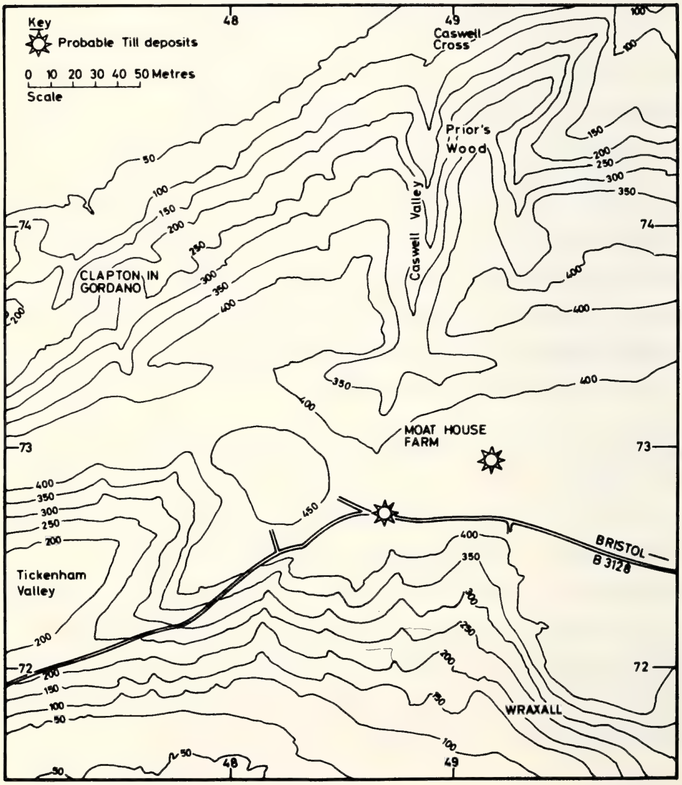
Key
Probable Till deposits
0 10 20 30 40 50 Metres
Scale
48
49
Caswell Cross
Prior's Wood
Caswell Valley
CLAPTON IN GORDANO
MOAT HOUSE FARM
Tickenham Valley
BRISTOL
B 3128
WRAXALL
74
73
72
50
100
150
200
250
300
350
400
450

Fig. 2. Map of Moat House Farm area showing position of probable glacial deposits. Contours in feet.

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BOOK REVIEW

The Exmoor Handbook and Gazeteer

by N.V.Allen

76 pages with one pull-out map, many drawings and eleven photographs. Exmoor Press: 60p. Third Edition, 1974.

This volume in the 'Microstudy' series on Exmoor, edited by Victor Bonham-Carter, is remarkably comprehensive in scope and provides something for most tastes (as a handbook should), in eminently readable style.

The first chapter gives basic geographical and climatic data, sources of further information, museums, libraries and local newspapers. The second and longest chapter describes the landscape, including the rivers and the best-known localities. Then come sketches of 'Man and the Moor' from the earliest times to the present, and a short account of the literary associations of the Moor, devoted largely to the Doones, and giving interesting details of possible origins of the Doone legends.

The fifth chapter is a sketch of the commoner mammals, reptiles, birds, plants and trees of the region. The final chapter deals with recreation and amenities on Exmoor.

A gazetteer lists, in seven pages, a hundred and eight named places, with their National Grid references and a few salient points concerning each. All the villages and towns of the Moor are included, as well as historic monuments and places of interest. A final page lists references for further study.

Those interested in wild life will find the appropriate chapter a useful introduction, though of course it does not pretend to cater for the specialist.

Apart from its obvious use, this is a book to be dipped into. It is a good achievement, at its modest cost.

P.S.H.Boyce

THE PROCEEDINGS OF THE SOCIETY

FIRST SERIES, 1862 - 1865

by P.J.M.NETHERCOTT

The Society, which was founded on 8th May 1862, did not until 1866 publish its own Proceedings. Accounts of its meetings and excursions in the years 1862-1865 were supplied to the Bristol newspapers by the Secretary, and from 1863 onwards by the Reporting Secretary who was appointed for that purpose. At first a member could only keep a printed record of a meeting if he cut out from a newspaper the report which followed the meeting. This was unsatisfactory so the Society arranged, commencing with the meeting of the 1st October 1863, to obtain from Somerton & Co., the publishers of the *Bristol Daily Post*, for a small payment, offprints of the reports appearing in that paper. These offprints were circulated to members. This practice was followed until March 1866.

About April 1866 the Society commenced separate publication of its *Proceedings*, the first number dealing with the meetings of January to April 1866 inclusive and carrying extended versions of the newpaper offprints for the first three months of 1866.

In later years the newspaper accounts were treated as the First Series of the *Proceedings*, while the first separately published accounts from 1866 to 1872 became known as the Second Series. How many newspaper accounts went to make up the First Series has never been recorded for the reason that, although the dates of all the meetings and excursions could be traced, no complete collection of newspaper cuttings and offprints was known to exist.

In the years 1862 to 1865 the Bristol daily papers were the *Bristol Daily Post* and the *Western Daily Press*, joined in 1865 by the *Bristol Times and Mirror*, being a combination of the weekly papers the *Bristol Times* and the *Bristol Mirror*. From an early date the *Bristol Daily Post* seems to have been preferred medium for accounts, hence the need to obtain records from that paper of all the Society's meetings. As this paper is no longer available for inspection at Bristol the writer examined the copies at the British Museum Newspaper Library at Colindale.

Of the seventeen meetings from 8th May 1862 to 9th September 1863 only a few newspaper cuttings of some of the meetings exist in the

Society's records, or elsewhere, and it was not always clear whether these cuttings came from the *Bristol Daily Post* or another paper. The outcome of the search at Colindale was to establish that the ten indoor meetings were all reported in the *Bristol Daily Post* but of the seven excursions only two have accounts in that paper. Photographed copies were obtained of the issues bearing the accounts not otherwise available in Bristol.

Here follows a list of the dates of meetings and the dates of the accounts, where such exist, in the *Bristol Daily Post*.

Date of meeting	Date of account in *Bristol Daily Post*	Page and column number in paper	
1862	1862	P.	C.
8 May (inaugural)	9 May	3	4
5 June	6 June	2	4
8 July	(no report)		
20 August	26 August	2	7
13 September	(no report)		
2 October	6 October	2	4
6 November	12 November	2	4
4 December	8 December	2	6
1863	1863		
8 January	12 January	2	5
5 February	9 February	3	4
5 March	6 March	3	5
2 April	3 April	2	5
8 May (first annual general meeting)	11 May	2	7
16 June	(no report)		
21 July	23 July	2	7
21 August	(no report)		
9 September	(no report)		

Meetings and excursions of the Society from 1st October 1863 to the end of 1865 became numerous when in 1864 Entomological, Botanical, Geological and Chemical and Photographic Sections came into being, followed in 1865 by a Zoological Section, each presenting its own programme. In spite of the arrangements with the *Bristol Daily Post* for the Society to have a supply of offprints no complete collection of these can be found in the Society's possession but a study of the dates of the meetings and of certain incomplete collections has established that accounts of all the meetings and excursions were covered by offprints from that paper numbering thirty-nine in all. The normal, but not quite invariable, practice for these newspaper reports was to arrange fairly long separate accounts of general meetings and consolidated short accounts of sectional meetings covering about four weeks at a time.

Here follows a list of the offprints by reference to the dates of the issues of the *Bristol Daily Post* bearing the accounts. To complete the record of the offprints the four of these relating exclusively to the Society's meetings in early 1866 are also listed.

1863 *5 October, *9 November and 7 December

1864 11 January, *8 February, 7 March, 11 April, *9 May, 20 June, 18 July, 19 August, 26 September, 12 and 27 October, 7 and 21 November, and 7 and 23 December.

1865 *16 and 23 January, 6 and 20 February, 6 and 22 March, 10 and 20 April, 8 and 24 May, 21 June, 2 August, 1 and 20 September, 9 and 17 October, 6 and 16 November and 11 and 18 December.

1866 8 and 22 January, 5 and 20 February, and 5 March. (The issue of 22 January bears an account of one sectional meeting in 1865 and three sectional meetings in 1866).

The offprints are on paper of varying size, headed 'Bristol Naturalists Society', usually followed (except for general meetings) by a sub-heading such as 'Annual Meeting', 'Excursion Meeting', 'Sectional Meetings', as appropriate and followed again, in nearly every case, by 'From the Bristol Daily Post of ....' (date). The offprints are in double column, accounts of general meetings under the printed signature of W. Lant Carpenter, the Reporting Secretary, and accounts of sectional meetings under the signatures of the appropriate sectional secretaries and Mr. Carpenter. The textual accounts of the offprints correspond with the actual accounts in the newspaper, only the headings and signatures being added in the offprints and the layout being in double column.

The *Bristol Daily Post* was a paper of four pages only and its editor, John Latimer, remembered today for his *Annals of Bristol*, was certainly generous in publishing such extensive accounts of the Society's meetings. The paper had been founded in 1860, publishing daily from Monday to Friday, by the owners of the *Bristol Mercury*, a Saturday paper commenced in 1790. The newspapers were fused in 1878 and ceased publication in 1909.

It seems that the quantities printed of each offprint would be about 300 copies. The Society has small stocks of about half of the offprints but the others are rare. A few members cut up their offprints, discarding the headings and the signatures, and pasted the text in small notebooks. Two copies examined by the writer are incomplete and the accounts have not always been wholly from the *Bristol Daily Post*. Of the forty-three offprints in question, 'cut-up' copies only have been seen of the five marked * above.

Accounts of the meetings between 1862 and 1865 also appeared in the *Western Daily Press*. Some of these are identical with those of the *Bristol Daily Post* and others are somewhat shorter, while of some meetings no accounts appear at all. In the Saturday-published *Bristol Times* and *Bristol Mirror* there are much shorter accounts of less than half of the meetings in 1862 and 1863. The *Bristol Times* of 12th September 1863 has a five-lines account of the excursion of 9th September, not recorded in the other papers.

This narrative must consider what matter in print may be treated as constituting the First Series of the *Proceedings* of the Society. Hindsight would suggest that the Society was unfortunate in giving the designation of First Series to an unknown number of newspaper accounts, the earliest of which are not even represented by offprints from any paper.

The earliest use in print of the term 'First Series' appears to be on the outer back cover of the *Proceedings* published in 1905 (for 1904). This cover lists the Society's publications available for purchase commencing with "Proceedings 1st Series (1862-1865). - In the form of Newspaper slips (offprints) of the Official Reports of the Reporting Secretary. Some of these are still in stock. Prices on application". The text continues by referring to the *Proceedings* of 1866-1872 as the 2nd Series, those of 1873-1903 as the 3rd Series and the issue in question is on its cover entitled 'Fourth Series, Vol.1 Part I'.

The choice, however, ought to be made, and in the light of the circumstances that the fullest accounts appear in the *Bristol Daily Post* it would perhaps be sensible to treat the twelve accounts in that paper not represented by offprints and the thirty-nine offprints from it as making up the *Proceedings*, First Series. It is now possible to assemble sets of these newspaper accounts between 1862 and 1865 and when done the Society will have available, together with the Annual Reports, as full a record in print of its first four years as is possible at this passage of time.

In addition, the Society each year had printed in pamphlet form Reports of the Council as read and adopted at the Annual General Meetings held in May of the years 1863 to 1866 covering the first four years of the Society's existence. Each Report has information on the progress of the Society and the briefest of notices of meetings and excursions of the previous year together with a list of officers, a financial account, the rules and a list of members (without addresses). Soon after the foundation of the Society a ten-page pamphlet was also issued listing members' names and setting out the rules of the Society. There are a few inaccurate dates for meetings in these Reports and in particular W. Sanders' account of the fossil fish *Holoptychius* at Portishead is wrongly attributed to the March meeting of 1863 instead of the February meeting.

In the opening years of this century the late Dr.A.B.Prowse, a former President, Treasurer and Librarian of this Society, interested himself in its early history and notes he prepared when librarian considerably assisted the present enquiry. A short account of his research appears in the Library Report for 1904, part of the Society's published Annual Report for that year. The help of the British Museum Newspaper Library and Bristol Central Library in producing newspapers in their care was also much appreciated.

INSTRUCTIONS TO CONTRIBUTORS

1. All matter offered for publication in the Proceedings must be sent as directed on the inside front cover of the current issue.
2. To ensure consideration for inclusion in the next issue, contributions must be received not later than February 28.
3. All copy must be type-written with double spacing and good margins.
4. Copy submitted is not returnable and authors are advised to keep a duplicate.
5. At the discretion of the Hon. Editor, contributors may be required to furnish short abstracts of their communications, for printing as summaries.
6. Photos and drawings supplied for illustrations will be returned.
7. The copyright of all published matter shall be the property of the Society, whose Council has power to permit reproduction.
8. Authors shall be entitled to 25 copies of their papers (without covers), free of charge.

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The dates given are those of election to office.

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Anyone interested in Natural History may apply to join the Society as a Full member. The annual subscription is £2·00. Members of the household of a Full Member may become members for an annual subscription of 75p. Persons residing outside a radius of twenty miles from the City Centre of Bristol qualify for a reduced annual subscription of £1. There are also Junior membership facilities for persons between the ages of 12 and 18 years at the reduced subscription of 50p. A prospectus giving fuller details of the privileges of the various classes of membership may be obtained from the Honorary Treasurer:—

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6 Hazelwood Court,
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PROCEEDINGS OF THE BRISTOL NATURALISTS' SOCIETY

The Society has stocks of back numbers of most annual parts of the *Proceedings* which may be purchased at the price of £1 per part, postage extra. In addition, a Centenary History of the Bristol Naturalists' Society, 1862–1962, being Part IIIA of *Proc.*, 1961. Price 25p, postage extra, is still available. Application should be made to the Honorary Librarian, Bristol Naturalists' Society, City Museum, Bristol 8.

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1974

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OF THE

Bristol Naturalists' Society

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not later than feb. 28.

Other instructions for authors appear on page 112.

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The SOCIETY'S LIBRARY is housed in the City Museum and is available to members between the hours of 10 a.m. and 5.30 p.m. on weekdays.

Frontispiece

Harvest Mouse climbing in wheat.
Photograph by Stephen Dalton F.R.P.S.

NOTE - The Bristol Naturalists' Society is a signatory to the Fair Copying Declaration, details of which may be obtained from The Royal Society, 6 Carlton House Terrace, London SW1Y 5AG.

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Membership at the end of the year was 827 including 64 juniors. There are 10 affiliated societies. At the Annual General Meeting the Officers and Members of Council were elected with Dr. D.H. Peregrine as President.

Council are pleased to announce that Miss Joan C. Weir accepted their invitation to be Publicity Officer and that she is a co-opted member of the Council.

Instead of the Annual Dinner, a Buffet Supper was held in the Royal Hotel with Dr. Ernest Neal as the guest speaker on "The Forgotten Islands of the Indian Ocean".

The increasing rate of inflation has forced the society to investigate methods of saving costs and thereby postponing another increase in subscription. It was decided to reduce the cost of publishing the 'Proceedings' by using the process of off-set lithography. At the same time the bi-annual programme card was replaced by a duplicated sheet. The Society is very grateful to all those members who distribute the monthly bulletin by hand. This represents a considerable financial saving to the society.

With deep regret we record the deaths of Mr. A.W. Adams, Mr. S.H.G. Barnett, Miss V.V. Cook, Mr. A.C.Leach, Miss F.E. Messiter, Lady Pugsley, Mr. J.F. Rowe and Mr. N.E. Varley.

AUDREY HECKELS, *Hon.Secretary*

REPORT OF THE CONSERVATION COMMITTEE, 1974

The survey of semi-natural areas in Avon County north of the River Avon has continued and maps indicating these areas have been submitted to the Avon Planning Authority.

Longleat Enterprises applied for planning permission to construct a Cable Car Lift at Cheddar Gorge. A site survey indicated that the proposal could ultimately lead to damage to the rarer species of distinctive limestone flora, particularly the Cheddar Pink *(Dianthus gratianopolitanus)*.

We lodged an objection, and the Somerset Trust and a number of national and local amenity bodies also objected. The District Planning Authority has refused permission.

Bristol Waterworks applied for planning permission to extend an area at Littleton Clay Pits for the disposal of slurry from their treatment works. The large pond affected is an excellent hanitat for birds, particularly Reed Warblers and Buntings and is well used by Spring and Autumn migratory water fowl that follow the Severn Valley. We opposed the proposals and were represented at an enquiry held by the Northavon Planning Authority. Although permission was subsequently granted, certain conditions appled which we had suggested as a possible compromise. We also have the opportunity to study the area and record ecological changes over the next five years when this provisional permission will need to be reviewed.

The Planning Authorities were advised of the deplorable state of a rubble tipping site on Nailsea Moor and an objection was made to a proposed extension of this tipping over adjacent marshland. The North Woodspring Planners have refused the application.

Following upon successful opposition in 1972 by ourselves and other bodies to the tipping of excavation materials at Bury Hill (Winterbourne Down), an enforcement and stop notice was served by the Sodbury R.D.C., but the tipping contractors appealed. A Local Enquiry was held in February 1974 when we made further representations. The Inspector upheld the views concerning the site's natural attractions, particularly the wooded slopes, and in this respect the appeal failed.

A leaflet "Recreation and Amenity" was issued by the Bristol District Council "Open Spaces and Amenities" Committee. This sought the views of the public on the use of open spaces within the District, including the Ashton Park Estate. A concise report covering Ashton Park, Blaise Castle and Eastville Park/Oldbury Court Estates was submitted, the main consideration being the retention of those areas as natural habitats with no commercial exploitation.

The Joint Committee for Nature Conservation in Avon has passed to Avon County Planning Department detailed observations and recommendations on Avon's proposed Interim Development Plan. The Bristol Naturalists made a significant contribution on those aspects of the plan related to semi-natural habitats in and around the Bristol District. The Plan is considered an interim measure providing guidance to planning policy during the next three years until the Avon Planners are able to complete the new County Structure Plan.

K.T. BATTY, *Chairman*

REPORT OF BOTANICAL SECTION, 1974

At the Annual General Meeting in the Botany Department Herbarium on 28th January, 1974, the following were elected: President: Dr. A.F. Devonshire; Secretary & Treasurer: Miss I.F. Gravestock; Committee: Dr. T.E.T. Bond, Mrs. C.H. Cummins, Mrs. N. Vaughan Davies, Mr. C.H. Hurfurt, Mr. P.J.M. Nethercott, Dr. D.H. Peregrine, Mrs. T.B. Silcocks and Dr. M.C. Smith.

The following winter meetings were held:-

January 28:	Annual General Meeting and 'Snowdonia and its Plants' by Dr. A.F. Devonshire.
February 25:	Members' Evening and Exhibition of Herbaria.
March 18:	Reproduction in Flowering Plants by Dr. D. Gledhill.
October 28:	Members' Evening, with transparencies.
November 25:	Some North American Alpines, by Dr. T.E.T. Bond.

The following field excursions took place, under the leadership of those shown:-

March 23:	Leigh Woods, to study Winter Trees. Mr. P.J.M. Nethercott.
April 27:	Turn Hill, Weston-super-Mare. Dr. A.F. Devonshire.
May 7:	Brandon Hill. Dr. A.F. Devonshire.
May 25:	Dolebury Warren. Mrs. N. Vaughan Davies.
June 16:	Rhigos and Penderyn, Vale of Neath. Dr. D.H. Peregrine. Nearly a dozen species of *Carex* were seen, including *C. curta*, *C. rostrata* and *C. serotina* also *Trollius europaeus*, *Pinguicula vulgaris*, *Menyanthes trifolia*, *Platanthera bifolia* and *Dactylorhiza praetermissa*, the last two in a field that had not been mown for six years.
June 18:	University Botanic Garden, Bracken Hill, with Dr. M.C. Smith, Mrs. T.B. Silcocks.
June 29:	Wyndcliff and Black Cliff, Gwent. Mr. P.J.M. Nethercott. *Euphorbia serratula*, *Neottia nidus-avis*, *Carex digitata*, *C. montana*, *Campanula latifolia*, *Geraneum sanguineum*, *Catabrosa aquatica* and *Chrysosplenium alternifolium* were among the plants seen.
July 3:	Open Day, Long Ashton Research Station, Dr. T.E.T. Bond.
July 6:	Portbury Wharf. Mrs. T.B. Silcocks. *Lathyrus nissolia* plentiful.
July 20:	Binegar Bottom and Windsor Hill. Miss I.F. Gravestock. *Eleocharis uniglumis* and *Blysmus compressus* seen in Windsor Hill marsh S.S.S.I.
August 3:	Upper Ashton Park to Providence Place. Mr. C.H. Cummins.

Floribus albis and *Duchesnea indica* in fruit were among plants seen.
August 17: Box Hill and district. Mr. C.H. Hurfurt.
September 14: *Sorbi* in Avon Gorge. Mr. P.J.M. Nethercott. Fruiting *Sorbi* were seen, including *S.aria, S.torminalis, S. aucuparia, S.bristoliensis, S.eminens, S.anglica, S.porrigentiformis, S.wilmottiana, S.intermedia, S.latifolia, S.aria x aucuparia.*
October 5: Fungus Foray to Westonbirt. Joint Meeting with British Mycological Society. Dr. T.E.T. Bond and Mr. Collings.

I.F. GRAVESTOCK, *Hon.Secretary*

REPORT OF ORNITHOLOGICAL SECTION, 1974

The President, Secretary and Assistant Secretary were re-elected for 1974.

Seven indoor meetings were held, with an average attendance of 63. They included talks on the birds of Spain, of South America, Spitzbergen, The Eastern Mediterranean and Somerset, and on the Oystercatcher.

Twenty field meetings were held, attended by an average of 15 people; seven of them were inside the city of Bristol.

In the course of the year the section contributed to the BTO Nest record scheme, returning over 500 cards, the National Habitat register, the Ringing scheme, the Birds of estuaries enquiry, and the Common Bird census. Local fieldwork included a survey of Birds in gardens, of Kestrels nesting in the city, of the status of Shelduck, and attempts to survey the tidal Avon, and the Starling roosts in Avon county.

It was decided that, as a result of the changes in local government boundaries, the 1974 report would be on the county of Avon.

R.L. BLAND, *Hon.Secretary*

REPORT OF MAMMAL SECTION, 1974

At the 8th Annual General Meeting held on 15th February, the following were elected: President: Mr R.G. Symes; Secretary and Treasurer: Miss E.J. Lenton; Mammal Recorder: Mr R.G. Symes; Herpetological Recorders: Miss J.B. Webb, Mr A.F. Jayne and Andy Buchan; Committee members: Miss J.B. Webb, Messrs Burberry, Jayne, Surch and Walker and Dr R.J.G. Savage.

Six indoor meetings were held:-
January 15: Annual General Meeting and members' slides.
February 19: Badger Evening, by Mr A.F. Jayne.
March 19: The Distribution and Abundance of Animals - with emphasis on Reptiles, by Dr R.A. Avery.
October 25: Dormice and Harvest Mice, by Mr S. Harris and others.
November 12: Mammal Identification, by Mr R.G. Symes and the Section's committee.
December 10: Moles, by Professor K. Mellanby.
The average attendance at these meetings was 45.

Field meetings were as follows:-
January and February meetings were cancelled owing to the current petrol shortage.
March 24: Hill End Camp, Oxford. Miss Elaine Hurrell.
April 21: Conservation on Mendip. Miss J.B. Webb.
May 3, 10, 17 and 24: Badger Watches. Mr A.F. Jayne.
June 9: Lizard Count in Velvet Bottom. Dr R.A. Avery.
June 23: Mammal Survey. Mr R.G. Symes.

July 21: The Broadmead Brook. Mrs M. Browne.
August 18: Brown's Folly Reserve. Miss E.J. Lenton.
September 22: The Quantocks. Mr F.H. Rawlings.
October 5: Woburn Deer Park. Mr Dennis Talbot.
October 27: Harvest Mouse Survey. Mr S. Harris.
November 17: Dormouse Survey. Mr R.G. Symes.
December 1: Mendip Walk.

Members are contributing to the Mammal Society's national surveys on harvest mice, otters and dormice; also to its national distribution mapping scheme as well as to the Section's local one.

E.J. LENTON, *Hon.Secretary*

REPORT OF GEOLOGICAL SECTION, 1974

The Annual Business Meeting of the Section was held on 17th January 1974, in the Geology Lecture Theatre of the University. The following were elected: President; Mr T. Harrison; Vice-President: Mr A.E. Frey; Hon. Secretary: Dr A.B. Hawkins; Hon. Field Secretary: Mr D. Hamilton; Committee: Professor D.L. Dineley, Student President of the University Geology Society (both ex-officio), Mrs Hamilton, Mr Hollingsworth, Dr Insole, Miss Pounder, Mr Thompson.

The programme included:-

February 28: "Two Carbonate Environments". Dr J.W. Murray and D. Hamilton.
March 14: "Hydrology of the Mendip Hills". D.I. Smith.
October 17: "Gemstones". Professor Howie.
November 27: "A Geologist in Arctic Norway". Dr D.L. Speedyman.

The following field meetings took place:-

May 26: Cattybrook Quarry. Dr P.L. Hancock.
June 8: Ladye Bay and Clevedon. Dr D.L. Speedyman.
July 7: Penarth Area. D. Hamilton.

A.B. HAWKINS , *Hon.Secretary*

REPORT OF ENTOMOLOGICAL SECTION, 1974

The following were elected at the Annual Business Meeting on 8th January: President: B. Harper; Secretary: G. Best; all members of the section will be eligible to serve on the Committee. Recorders: Moths-K.H. Poole; Butterflies and other orders - Mr A.N. Grose.

Field Meetings in 1974:

May 19: Goblin Combe.
June 16: Cadbury Camp.
August 11: Brean Down.

Indoor Meetings:

September 28: Amateur Entomologists' Society Exhibition, London.
November 5: Members' Evening.

There has been increased interest taken in the section in the last year and it is felt that the strength of the section is better reflected by the attendance at the Members' Evenings than at Field Meetings.

G. BEST, *Hon. Secretary*

THE JUNIOR SECTION, 1973-1975

This is a brief account of three years activities of the Junior Section. Chris. Smith, known affectionately as "Doc", gave up the task as Leader of the Junior Naturalists in January 1972. He had devoted a great deal of time over the five years of his leadership and used up much energy in making interesting meetings. His salubrious flat became well known to many of the older members, who found him very willing to listen to their chatter and enjoy their company. We are still glad of his frequest help.

In the past three years we have had ups and downs. As Leader, it is often hard to tell whether meetings have been enjoyable or successful. A visit to Cromhall with Janny Humphries produced a wonderful view of a lesser spotted woodpecker which was particularly interesting to a keen "junior" ornithologist on his first trip. A weekend at Hillend Camp at Oxford was most enjoyable, thanks to Elaine Hurrell's energy and organisation - as well as seeing muntjac deer, fallow and Sika deer, and lots of interesting butterflies and moths, eg. Purple Emperor in Water Perry Forest, there was plenty of time and a pool to work off high spirits. April 1974 saw us in Minsmere Bird Reserve on a rather grey though exciting weekend due mainly to the enthusiasm of our secretary Richard Chadwick. Nearer home, we tramped the Mendips in sun and rain, plodded our way around Wetmore Reserve whilst looking for mammals, and quietly froze while waiting for badgers to appear.

Our indoor meetings have covered many topics, from forestry to pondlife, exotic islands of the Indian Ocean, local birdlife and animals. Recently we had a very enjoyable evening provided by two badger cubs and a buzzard belonging to Mr. Chaffe.

We are indebted to those adults, often of our own society, and also to outsiders, who give their time willingly and freely to encourage and interest us.

JOHN BAINBRIDGE, *Junior Leader*

ACCOUNT OF GENERAL MEETINGS, 1974

Our first meeting of the year on Thursday, 24th January was an address by our President, Mrs. A. Hollowell, entitled "Living things in a Changing World".

February 7:	"Winter in Wisconsin" by Dr. D.H. Peregrine. Dr. Peregrine gave an account of a severe continental type Winter when temperatures drop well below 0°F.
March 7:	"Animals of the Australian Great Barrier Reef" by Dr. T.E. Thompson.
October 3:	"Life in Ponds and Puddles" by Dr. R.S. Wilson.
November 7:	"The Natural History of Australia" by M.F. Abbotsmith. Mr. Abbotsmith's main interest is conchology and he showed slides of breathtaking beauty.
December 5:	"Members' Evening" - short accounts by members of their experiences in various parts of the world.

GENERAL FIELD MEETINGS, 1974

Eleven day or half-day field meetings and three evening meetings were held and were generally well attended except at the end of the year. Three mid-week rambles were also held. A list of the meetings with leaders and an indication of things seen is given below. A fuller account is kept in the records of the Field Committee.

January 26:	R. Curber. Peterstone Wharf, near Newport. Birds, inc-

cluding a snow bunting.

February 16: A.F. Devonshire. Castell Coch and St. Fagan's, Cardiff. St. Fagan's is the Welsh Folk Museum, with many old buildings and extensive grounds.

April 12: A.F. Devonshire. Maiden Castle and Maumbury Rings, Dorchester. An Iron Age Hill Fort and a Roman Amphitheatre.

May 15: D.A.C. Cullen. Nag's Head Plantation, Parkend. An evening walk to see roding woodcock.

May 18: Miss R.C. Lee. South Malverns. A walk from Hollybush to the Herefordshire Beacon.

June 2: H.G. Hockey. Tarr Steps to Dulverton. A walk along the wooded valley of the River Barle.

June 15: Miss J. Cox and Miss C. Groves. Windsor Great Park. The party visited the Valley Gardens, Virginia Water and the Saville Gardens.

June 20: H.G. Hockey. Rowberrow. An evening walk from Tyning Farm over Blackdown to Rowberrow Inn.

June 26: Miss E.J. Vinnicombe. The garden at Vine House, Henbury, followed by a walk along Hazel Brook to Combe Dingle.

July 2: Miss R.C. Lee. Cadbury Camp. An evening walk from Tickenham Hill, Walton Moor, and Walton-in-Gordano.

July 14: Miss E.J. Vinnicombe. Shapwick. A large willow farm at Stathe followed by a visit to the Shapwick Nature Reserve.

July 17: A.F. Devonshire. Abbots' Pool, Failand. An afternoon walk near the Pool, followed by a visit to Abbots' Leigh.

August 17: R. Curber. Studland, Poole Harbour. The party visited the Museum and walked round the shore of Poole Harbour.

August 21: Miss C. Groves. Leigh Woods. An afternoon walk through Leigh Woods and along the left bank of the Avon.

September 14: H.G. Hockey. Hengistbury Head, Christchurch. The party walked round Hengistbury Head in rather wet conditions.

October 20: Miss E.J. Lenton. Avon Valley. A walk from Bathford through Warleigh Woods and along the Avon Valley to Dundas Aqueduct, followed by a visit to the American Museum.

November 9: R.J. Curber. Abbotsbury. At Abbotsbury the party walked by the Fleet, and saw shore birds and hares. More birds were seen at Portland causeway and Weymouth.

A.F. DEVONSHIRE, *Hon.Field Secretary*

REPORT OF THE LIBRARIAN, 1974

This year has been a particularly active one for the Library Committee. The Society's decision to sell little-used foreign material, reported by the Librarian in 1971, was implemented by the sale of 28 runs of journals. The Library Committee has also been concerned with finding alternative storage for that part of the Society's collection which has been housed for thirteen years in the Queen's Building of the University.

After several months of discussions, shelf space for those journals remaining from this part of the collection was very kindly provided by the University Librarian, and by Dr. J.W. Cowie. These journals are now available for members to borrow from the Undergraduate Reading Room of the University Library, and in the Geology Department.

During the year, all the Society's journal holdings have been checked, various missing back issues have been purchased to fill gaps, and some ninety volumes have been sent for binding.

The Society is extremely grateful for several gifts received this year, in particular, for an almost complete bound run of the *Proceedings* from the Howard Davis bequest. Ten new books have also been purchased.

209 books and journals have been borrowed by 37 different members. We hope that 1975 will see increased use of the Library to repay the effort put in by the Library Committee and its helpers. To these, to the University Librarian, and to the Director of the City Museum, the Society continues to be indebted.

JENNIFER SCHERR, *Hon.Librarian*

OBITUARY

A.C. LEACH

Arthur Croome Leach was born in 1895. He was educated at Rugby and St. John's College, Oxford, where he read history. He served in France during the First World War; then from 1921 until he retired in 1959 he taught at Clifton College. He died on April 15, 1974.

His boyhood interest in birds remained with him all his life. He joined the Society in 1929, when thirty or so members of the Ornithological Section met in one anothers' houses. His paper on "The Birds of Barrow Gurney Reservoirs" appeared in the Proceedings for 1933. In 1941 he lectured to the Section on "Bird-life of the Bristol Avon" and in 1946 on "Bird-life in North Cornwall", an account of observations by the Clifton College Natural History Society during the years the College spent under war conditions at Bude. He was a major contributor to Howard Davis's paper "A Revised List of the Birds of the Bristol District", which appears in our Proceedings for 1947. He led a number of field walks for the Section and until the last few years he contributed regularly to the Bristol Bird Report and its predecessor paper.

He first served as a Council member of our Society in 1937 and was a Vice-President for two periods. From 1951 to 1953 he was President of the Ornithological Section. He served as Secretary of the Society from 1959 to 1963, covering the onerous period of preparation for our Centenary and its happy and successful selebration in 1962. His work for the Society was recognised by his election as an Honorary Member in 1965.

At Clifton College, with the late W. R. Taylor, also a member of our Society, he actively interested boys in serious bird-watching. Several of them in adult life became prominent amateur or professional ornithologists.

He outlived many of his contemporaries, H. Tetley, W. R. Taylor, Harry Savory, H. H. Davis and others, to whom the writer of this note would have been glad to turn for the portrayal of birdwatchers and their hobby of a generation ago. The latter-day naturalist will remember his tall figure, regularly to be seen bicycling about Bristol or going around with a few of his older friends to enjoy the bird-life of the surrounding district. His portrait appears in the Society's Centenary History, published in 1962.

He is survived by his wife and his two sons and daughter, to whom the Society's sympathy is extended.

P. M. J. NETHERCOTT

ACCOUNTS FOR THE YEAR ENDED 31 DECEMBER 1974

1973 £		£	£
	Members' Subscriptions		
1,078	Full Members	1,136.00	
90	Full Members of the same household	104.25	
28	Corresponding Members	34.00	
17	Associates	11.00	
38	Juniors	28.00	
19	Affiliated Societies	21.25	
1,270			1,334.50
4	Donations		0.25
173	Proceedings		
	Grants	136.00	
	Offprints	29.94	
	Sales	23.82	
1,447			189.76
8	Field Committee: Profit		- -
1	Sale of badges		2.90
13	Profit on Dinner		9.85
47	Interest on deposit account		66.76
2	Interest from National Savings Bank		1.57
28	Interest on Bonds		28.00
2	Members contributions to the Harry Savory Illustrations Fund		3.50
1,239	Balance from last account		990.98
£2,787			£2,628.07

1973 £			£	£
265	General Printing and Stationery		266.12	
221	Postages and telephone		252.98	
486				519.10
1,011	Proceedings (1973, including offprints)			491.07
91	Books		52.72	
58	Subscriptions for journals etc.		61.60	
	Replacement of lost journals		48.17	
	Rent (of library room)		0.05	
4	Fire insurance (library)		5.00	
				167.54
20	Contributions to Council for Nature S.W.N.U. etc.			11.15
21	Fares and expenses of general meetings			- -
	Field Committee: Loss			17.45
105	Grants to Sections:			
	Botanical		10.00	
	Geological		10.00	
	Mammal		25.00	
	Ornithological		40.00	
	Junior		10.00	
				95.00
	Balances to next account:			
120	Cash in bank, current account	118.37		
	Less uncleared cheques	13.75		
			104.62	
347	Cash in bank, deposit account		713.65	
39	Deposit in National Savings Bank		40.70	
400	* £400 7% British Savings Bonds		400.00	
85	In hands of Field Committee		67.79	
				1,326.76
£2,787				£2,628.07

* Including the Harry Savory Illustrations Fund £67.33

Note: These accounts do not record balances held by sectional treasurers and the Ornithological Section Special Fund of £105.10

P. J. M. Nethercott
Hon. Treasurer
10 January, 1975

Audited and found correct
T. B. Silcocks
18 January 1975

BRISTOL BOTANY IN 1974

BY A.J. WILLIS

(Department of Botany, University of Sheffield)

In general the year 1974 was an average one as regards weather conditions. Rainfall was about 10 per cent greater than usual, the total for the year being 1012.6 mm, whereas the temperature over the year was on average 0.2°C lower than normal; however, sunshine was fractionally above average. January and February were warmer, wetter and sunnier than usual, but the season was not very early because of a cold March and a rather cold April. A dry period from March until May was followed by a cold summer with every month from June to October having below average temperatures. These conditions were reflected in not very luxuriant plant growth during the summer, although the heavy fruiting of *Sorbi* was remarkable, and probably the best since 1956. September was an extremely wet month, and the year ended with a warm December, the temperature that month being 3.0°C above the average.

A notable loss to the Bristol flora may result from the destruction of the site near Axbridge where *Carex depauperata* has been growing in very small quantity for a considerable number of years. This very rare sedge, of highly restricted distribution in Britain, has not been seen during this century in Leigh Woods, so that it is probably now extinct in Somerset. On the other hand, constructional work, associated for example with road developments, has created bare areas in various parts of the Bristol area and afforded conditions suitable for colonization and spread of plants, of which several examples are noted here.

As in previous years, new localities for plants have been found partly as a result of recording for *Flora* purposes; also confirmation has been gained of the persistence of a substantial number of plants in sites for which they were recorded many years ago. A first record for vice-county 34 is made for *Petasites japonicus*; *Rorippa austriaca* and *Cicerbita bourgaei* are new to the Bristol district. Of particular interest is the establishment of the existence of hybrids between *Koeleria cristata* and *K. vallesiana* in four localities in v.c. 6 including Worle Hill and Sand Point. The hybrid was found together with both of the parents at all of these sites; *K. vallesiana* has not been recorded from Worle Hill in recent years, and there is no previous published record of this rare grass from Sand Point, so that its occurrence here represents an important extension of its known range. New localities are reported for several uncommon mosses and liverworts, and the record by Mrs. J. Appleyard of *Orthotrichum cupulatum* var. *nudum* from Mendip (Emborough) is the first authentic record of this taxon for v.c. 6.

The reprint (by The Chatford House Press) of the *Flora of Gloucestershire* is now available. The text is unchanged but almost all of the plates have been replaced.

Names of contributors associated with several records are abbreviated thus:

J.A., Mrs. J. Appleyard
C.H.C., C.H. Cummins
A.F.D., Dr. A.F. Devonshire
I.F.G., Miss I.F. Gravestock
C.W.H., C.W. Hurfurt
P.J.M.N., P.J.M. Nethercott
M.M.C.R., Mrs. M.M.C. Reiss
R.G.B.R., Capt. R.G.B. Roe, R.N.
C.G.T., C.G. Trapnell

Records are listed according to boundaries as used previously, which largely follow those given in White's *Flora of Bristol*. However, the area is extended slightly to the north-east, to include all District 5 of Gloucestershire (see Riddelsdell, Hedley & Price *Flora of Gloucestershire*).

G: Gloucestershire
S: Somerset

Dryopteris pseudomas (Woolaston) Holub & Pouzar Brockley Combe Wood, S, *R.G.B.R.*

Polystichum aculeatum (L.) Roth Binegar Bottom, S, *C.W.H.* (per *I.F.G.*).

Polypodium vulgare L. var. *serratum* Willd. Brockley Combe Wood, S, *J.A.*

Ranunculus lingua L. Still present near Kenn, S, *J.A.* It was reported from a pond near Hinton Charterhouse, S, in *Bristol Botany in 1973*. Information is now available (per *I.F.G.*) which indicates that the plants were introduced into the pond to improve its appearance some years ago.

Aquilegia vulgaris L. Belmont Hill, near Failand, S, *C.H.C.* Also in field bordering Midger Wood, G, *M.M.C.R.*

Thalictrum flavum L. Ditch on north side of Brent Knoll, S, *J.A.*

Papaver dubium L. Wasteland in valley in Shirehampton Golf Course, Bristol, G, *C.H.C.*

Fumaria capreolata L. Hedge of lane, south of Portbury, S, *R.G.B.R.* Also Locking village (previously recorded from Elborough), S, *J.A.*

Lepidium latifolium L. Plentiful by the Little Avon River, Berkeley, G, *P.J.M.N.* (Also noted by *C.S. Downer* in lush herbage on both sides of the Berkeley Pill near the village). Previously recorded from Berkeley in 1905 (see *Fl. Glos.*).

Cochlearia officinalis L. A single plant, Belmont Hill, near Failand, S, *C.H.C.*

Silene dioica (L.) Clairv. With white flowers, Failand, S, *C.H.C.*

Stellaria pallida (Dumort.) Piré On sandhills at Sand Bay, S, *R.G.B.R.*

Minuartia hybrida (Vill.) Schischk. In disused railway quarry, Emborough, S, and still on the railway embankment retaining wall, Newton St Loe, S, *R.G.B.R.* Also on old railway track near Yatton, S, *J.A.*

Spergularia media (L.) C. Presl Near Sea Mills, G, *C.H.C.*

Rhamnus catharticus L. Edge of wood, Shiplate Slait, near Bleadon, S, *J.A.*

Hippocrepis comosa L. With *Cotoneaster horizontalis* Decne. on limestone outcrop, Potter's Point, Blaise Castle, Bristol, G, *C.H.C.*

Vicia sylvatica L. Now profuse in Westpark Wood, Clapton-in-Gordano, S, and hanging over drainage channels above the M5 motorway, *E.S. Smith.*

V. lathyroides L. Still on Kewstoke sandhills, S, *R.G.B.R.*

Rubus idaeus L. With yellow fruit, in roadside hedge near Abbots Pond, Abbots Leigh, S, *A.F.D.*

Sorbus torminalis (L.) Crantz An old tree on clay soil in north-west margin of Ashton Park, Bristol, S, *C.G.T.*

Sedum forsteranum Sm. Tuttor's Hill, Cheddar, S, *I.F.G.* and *Miss V. Graham.*

Myriophyllum spicatum L. Weston Moor, S, *I.F.G.* All three native British species of *Myriophyllum* have now been recorded from the Gordano valley.

Euphorbia platyphyllos L. By fly-over over M5 near Northwick, near Mark, S, *J.A.* This spurge was reported from Brent Knoll in 1888 (White *Flora of Bristol*) but there is no more recent record.

Rumex maritimus L. Pond near mouth of Hill Pill, G, *P.J.M.N.* Recorded in *Bristol Botany in 1927* from this area.

Hottonia palustris L. Tor Hole, Eaker Hill Wood, near Chewton Mendip, S, *J.A.* Possibly introduced here.

Echium vulgare L. By railway near Pilhay Farm, west of Yatton, S, *J.A.*

Digitalis purpurea L. With peloric flower, by path, Abbots Pond, Abbots Leigh, S, *A.F.D.*

Veronica spicata L. ssp. *hybrida* (L.) E.F. Warb. A further locality in Leigh Woods, S, *P.J.M.N.* This plant, while not infrequent on the Gloucestershire side of the Gorge, has been reported from Leigh Woods only twice previously (see *Bristol Botany in 1912* and *Bristol Botany in 1960*).

Orobanche hederae Duby A dozen plants emerged through the tarmac at junction of pavement and road 5 ft from the nearest host plants in St. Mary's Road, Leigh Woods, Bristol, S, *C.G.T.*

Mentha x *piperita* L. var *piperita* Windsor Hill marsh, Shepton Mallet, S, *I.F.G.* (det. *Dr. R.M. Harley*).

Legousia hybrida (L.) Delarb. A few scattered plants in cornfield, near Bodkin Hazel Wood, near Dunkirk, G, *M.M.C.R.*

Lonicera xylosteum L. Field wall of lane, Wraxall, S, *H. Kay* (per *I.F.G.*).

Valeriana dioica L. Damp field west of Ridgehill, near Chew Stoke, S, *J.A.*

Bidens tripartita L. Weston Moor, S, *I.F.G.* Also in ditch, Keynsham, S, *C.W.H.*

Achillea ptarmica L. End of Moor Lane, north of Hutton, S, *J.A.*; also a double form, Belmont Hill, near Failand, S, *C.H.C.*

Chrysanthemum segetum L. Field near Buckland Dinham, S, *R.G.B.R.*

Cirsium eriophorum (L.) Scop. Six plants in dyke in field near Bays Wood, near Horton, G; also in field bordering Midger Wood, near Hawkesbury, G, *M.M.C.R.*

C. arvense (L.) Scop. var. *setosum* C.A. Mey A large colony on waste ground near New Bridge, Bath, S, *Dr. P. Macpherson* (conf. *Dr. W.A. Sledge*, per *R.G.B.R.*). Previous records from this area (White *Flora of Bristol*) seem to have been var. *vestitum* Koch.

Lactuca serriola L. Waste ground by the railway, Yatton, S; also abundant on waste ground at Highbridge, S; and a few plants near Burnham, S, *J.A.*, conf. at Kew.

Potamogeton coloratus Hornem. Weston Moor, S, *I.F.G.* This pondweed has already been recorded from Walton Moor.

Epipactis leptochila (Godfery) Godfery The record of this orchid from Hursley Hill (*Bristol Botany in 1973*) must be deleted. The plant flowered in good condition in 1974 and it was considered to be an unusual variety of *E. helleborine* (L.) Crantz by V.S. Summerhayes (per *R.G.B.R.*); it may have been accidentally introduced from the Continent. However, *E. leptochila* appears to be more widespread in Cheddar Gorge, S, than previously known. New colonies some way from the original site were found in 1974 by *Dr. J.T.H. Knight* and *R.S. Cropper* (per *R.G.B.R.*).

Platanthera chlorantha (Custer) Reichb. In lane, Wraxall, S, *H. Kay* (per *I.F.G.*).

Wolffia arrhiza (L.) Hork. ex Wimm. Abundant, with *Lemna minor* L., in peat cutting near Westhay, S, *Miss E.J. Lenton* (per *I.F.G.*). *Wolffia* is known for much of the peatmoor area.

Scirpus tabernaemontani C.C. Gmel. Wet area near old railway track near Congresbury, S, *J.A.* Also large patch in wet area around spring on top of hill (at 750 ft) above Dingle Wood, Nympsfield, G, *Mrs. S.C. Holland* and *Mrs. B.M. Mack*. This is the second v.c. 34 record east of the Severn (previously known from Wyck Rocks).

Carex depauperata Curt. ex With. The site near Axbridge, S, where this sedge has been growing in very small quantity for many years was found (*P.J.M.N.*) destroyed early in 1974. The continued existence in Somerset of this extremely rare plant is now doubtful.

C. strigosa Huds. Ditch, Honeyhall Lane, south of Congresbury, S, *J.A.*

Poa nemoralis L. Lane near Yatton and near Ubley, S, *J.A.*

Catabrosa aquatica (L.) Beauv. Ruts in lane near Churchill Green, S, *J.A.*

Koeleria cristata (L.) Pers. x *K. vallesiana* (Honck.) Bertol. This hybrid has been recently recognized, growing in extremely small numbers together with both parents, on Brean Down, Crook Peak, Worle Hill and at Sand Point, S, in a genetic study of the polyploid complex in *Koeleria* carried out by *R.S. Callow*. The pentaploid hybrids between *K. vallesiana* ($2n = 6x = 42$) and *K. cristata* ($2n = 4x = 28$) are intermediate in appearance between the parents but are very variable and there are no satisfactory morphological criteria for the identification of the hybrids. The discovery of the existence of these hybrids is exceedingly important, the Somerset sites being the only ones in Britain for both the hybrid and for *K. vallesiana*. A brief report on the polyploid complex is given by R.S. Callow in the *Biological Journal of the Linnean Society*, Vol. 6, No. 4, 1974, pp. 369-370. It is also of note that there are no recent records of

K. vallesiana from Worle Hill nor are there any previous published reports of this plant from Sand Point, so that its occurrence here represents an important extension northwards of its distribution in Somerset.

In an article by W.O. Howarth entitled 'Notes on *Koeleria* Pers.' published under 'Plant notes for 1932' in the Botanical Society and Exchange Club of the British Isles *Report for 1932*, pp.37-41, a description is given of *K. mixta* (as probably *K. vallesiana* x *britannica* (*cristata*)) from Uphill, and Druce, 1905, is cited. However, without a chromosome count, as indicated above, hybridity cannot be established.

ALIENS. *Hirschfeldia incana* (L.) Lagr.-Foss. This crucifer is well established on waste ground near Weston-super-Mare airport, S, *R.G.B.R.* It was first reported from this locality by R.M. Burton in 1962.

Lepidium ruderale L. Waste ground, Portishead, S, *C.H.C.*; known for this area since the beginning of the century.

Isatis tinctoria L. Waste patch, Rupert Street, Bristol, G, *M.M.C.R.*

Bunias orientalis L. A large clump in new plantation in Ashton Park, Bristol, S, per *R.G.B.R.*, noticed on B.N.S. Botanical Section field excursion (det. at British Museum).

Rorippa austriaca (Crantz) Bess. On side of lane leading to Hoar Gout ponds, near Avonmouth, G, *I.F.G.* and *A.F.D.*, conf. *A.J. Willis* and at Kew. This crucifer is naturalized in Britain in a number of localities near ports. It is known from Sharpness Docks, G (specimen in Kew Herbarium), but this is a first record for the Bristol district.

Descurainia sophia (L.) Webb ex Prantl Waste ground, Highbridge, S, *J.A.* Known around Burnham since 1818, but no report since 1945.

Vitis vinifera L. Naturalized in a hedge by footpath, Burnham, S, *J.A.*

Melilotis alba Medic. On waste ground, with *Foeniculum vulgare* Mill., near Bedminster, Bristol, S, *A.F.D.* Also on motorway bridge, Kingsweston, G, *I.F.G.*

Poterium polygamum Waldst. & Kit. Colonist in abundance on Belmont Hill, near Failand, S, *C.H.C.*, conf. *P.J.M.N.*

Cotoneaster simonsii Bak. A 9-foot specimen in hawthorn scrub in north-west margin of Ashton Park, Bristol, S, *C.G.T.*

C. microphyllus Wall. ex Lindl. Hedge near quarry near Lower Canada, near Hutton, and also old quarry south-west of Hutton, S, *J.A.*

Sedum reflexum L. Roadside, Windsor Hill, Shepton Mallet, S, *I.F.G.* Present in this site for many years.

Epilobium adenocaulon Hausskn. With *Chenopodium ficifolium* Sm., *Myosoton aquaticum* (L.) Moench and *Rorippa islandica* (Oeder) Borbás, colonizing excavated soil during the construction of the Marina, Keynsham, G, *C.W.H.*

Polygonum amplexicaule D. Don A well-established flowering clump at streamside, Littleton Warth, near Littleton-on-Severn, G, *I.F.G.*, conf. *J.P.M. Brenan*. There were no houses with gardens nearby, but old brickworks were in the vicinity. This is a second record for v.c. 34, being previously reported as a garden escape from the border of a wood along the Portway, Avon Gorge (*Bristol Botany in 1970*).

P. sachalinense F. Schmidt Roadside near Hutton, S, *J.A.*

Symphytum orientale L. In small spinney by Doulting churchyard, near Shepton Mallet, S, *J.A.*

Campanula rapunculoides L. On road embankment, Kevnsham, S, *C.W.H.*

C. medium L. Flowering on rubbish tip on top of railway tunnel, Windsor Hill, Shepton Mallet, S, *I.F.G.*

Doronicum pardalianches L. By river near Stanton Drew, S, *J.A.* Near

Blaise Wood, Bristol, G, *C.H.C.*

Petasites japonicus (Sieb & Zucc.) F. Schmidt This Giant Butterbur is covering about ¼ acre by stream and in scrub, and is spreading uphill into deciduous woodland, between Ashcourt and Brookhill, Lasborough, G, *Mrs. B.M. Mack* (per Gloucestershire Naturalists' Society). This is a first record for v.c. 34.

Cicerbita bourgaei (Boiss.) Beauverd At corner of Grove Road and Southwood Avenue, Westbury-on-Trym, Bristol, G, *C.H.C.* (det. *C. Jeffrey* at Kew, per *I.F.G.*). This is the first record for this Sow-thistle, native of Turkey, in the Bristol area.

BRYOPHYTES: HEPATICS *Calypogeia muellerana* (Schiffn.) K. Müll. Muddy field near Tyning's Farm, near Cheddar, S, *J.A.*

Nowellia curvifolia (Dicks.) Mitt. Eaker Hill Wood, near Chewton Mendip, S, *J.A.*

MOSSES *Dicranum montanum* Hedw. Eaker Hill Wood, near Chewton Mendip, S, *J.A.*

Tortula subulata Hedw. var. *graeffii* Warnst. Wall near the pool, Emborough, S, *J.A.*

Pottia lanceolata (Hedw.) C. Müll. Old quarry, Walton-in-Gordano, S, *J.A.* This confirms an old record.

P. bryoides (Dicks.) Mitt. Waste ground, Camerton, S, *J.A.*

Tortella inflexa (Bruch.)Broth. On stone in a field, Camerton, S, *J.A.*

Pohlia lutescens (Limpr.) Lindb. f. Lord's Wood, near Pensford, S, *J.A.*

Bryum pallescens Schleich. ex Schwaegr. On a wall, Ubley, S, *J.A.*

Aulacomnium androgynum (Hedw.) Schwaegr. Old colliery, Pensford, S, *Dr. R.W.M. Corner.*

Bartramia pomiformis Hedw. Old colliery, Pensford, S, *Dr. R.W.M. Corner.*

Orthotrichum cupulatum Brid. Old quarry, Walton-in-Gordano, S, *J.A.* This confirms an old record.

O. cupulatum Brid. var. *nudum* (Dicks.) Braithw. On stone in brook, Emborough, S, *J.A.* This is the only authentic record for v.c. 6, as the previous one from Brean Down is most unlikely.

Thuidium philibertii Limpr. Worlebury Hill, near Weston-super-Mare, S, *J.A.*

Scleropodium tourretii (Brid.) L.F. Koch Turf by the sea, Portishead, S, *J.A.*

I wish to thank everyone who has supplied records and helped with these, and especially Mrs. J. Appleyard, Miss I.F. Gravestock, Mrs. S.C. Holland, Mr. P.J.M. Nethercott and Captain R.G.B. Roe. Mr. J.P.M. Brenan kindly supplied information concerning *Rorippa austriaca*. I am indebted to Long Ashton Research Station for the supply of meteorological records.

BRISTOL MAMMAL REPORT, 1974

By ROGER G. SYMES

It is pleasing to report that interest in the mammals of the Bristol district remained at a high level in 1974, 663 completed record cards being received, the highest number since 1968. Some of these had several records on each, and numerous other observations were received on notepaper. There were 30 first records of species in 10 km. squares, representing additions to the national distribution maps published by the Mammal Society (Corbet 1971), these have been notified to the Biological Records Centre. 363 reports were new 1 km. square records for the Mammal Section's detailed survey of the Bristol district, this success being largely attributable to the 'feed-back' to observers of 'local' maps, each showing for an individual 10 km. square the known distribution of all species. A.F. Jayne contributed about half the total number of records received, involving 20 species, 96 reports being new 1 km. square records, and Miss E.J. Lenton recorded 18 species with 42 new 1 km. square records.

Mammal Section field meetings were arranged to offer on alternate months a "working" meeting or a "walk". Particularely notable was a meeting held at the workshop of Mr. G. Higgs, when 17 roosting boxes for bats and 12 nesting boxes for small mammals were made. Various members provided timber and Mr. Higgs very efficiently pre-cut the timber to pattern; the Section is most grateful to him. The boxes were put in position at a later meeting, but there has not yet been an opportunity to assess their effectiveness. An indoor meeting at which clues to finding both harvest mice and dormice were demonstrated, was followed by successful field meetings on each species.

A.F. Jayne sent in results of analysis of 17 complete barn owl pellets, and debris. He found remains of 42 field voles, 25 common shrews, 6 pygmy shrews, 2 woodmice, 1 house mouse and a bank vole. Glue (1974) published results of a national survey of barn owl pellets and provided a useful guide to anyone embarking on pellet analysis.

Concern was again expressed during the year over bats. A leaflet 'Focus on Bats' published by S.P.N.R. was intended to educate the public about bats. Unfortunately a householder at Claverham who used a pyrethrin aerosol on "about 40" bats, and one at Uphill who 'swatted' about 100 (including many young) with a badminton racket, had not read the leaflet. No corpses were kept in either case so the species could not be determined. Legislation which was proposed to give protection to two bat species and to the dormouse did not survive, but it is hoped they may become law in 1975. There were two unusual complaints about bats which triggered photo-electric cell burgular alarms!

The most recorded species in 1974 was the badger (102 record cards); many of these were contributed by M.G. Harris, who has been watching badgers in North Somerset intensively for several years. The species recorded by the largest number of people was the fox (34 observers), followed by grey squirrel (21), hedgehog and badger (19 each). Surprisingly only 7 people recorded moles, at present our most mapped species! The reorganisation of boundaries of the local authorities took effect in 1974 but did not change the recording area of the Mammal Section.

Thanks for records, newspaper cuttings and other help and information go to:-

R.Angles, J.Bainbridge, G.Barnfield, Mrs I.M.Barrett, K.T. Batty, R.L. Bland, D.W. and Mrs A.Bodley, Bristol Conservation Corps, Mrs M.Browne, J. and Mrs F. Bryant, J.Buchan, R.A. and Mrs V.M. Burberry, P.J.Chadwick, D.J.Childs, D.J.Collier, L.Cram, R.M.Curber, C.J.Dallinger, Dr A.F.Devonshire, P.J.Dillon, R.W.Emery, Miss J.D.Ethelston, P.Farmer, A.Gilman, Miss I.F.Gravestock, H.R.Hammacott, R.F.Harknett, M.G. Harris, S.S.Harris, G.Higgs, R.P.Hobbs, H.G.Hockey, J.Holmes, Mrs J. Humphris, P.Isaac, A.F., Mrs P., Miss H. and M.Jayne, Mrs S. Jones, D. Judson, A.V.R.King, P.Kitt, Mrs M.E.Knight, Miss R.C.Lee, R.Leeson, Miss E.J.Lenton, Mammal Section Field Meeting, T.K. and Mrs P.Marston, J.Milton, Ministry of Agriculture Fisheries and Food, F.Newman, R.E. Painton, D.H.Peregrine, J.G. and Mrs S.Prince, E.W.Powell, D.J.Richards, Miss M.H.Rogers, Mrs S.Savage, Mr and Mrs D. Shaddick, S.Silvester, Dr C.E.D.Smith, Mrs C.Spencer, C.Sperring, R.E.Stebbings, B.Steer, Mrs S. Steward, R.Surch, Mrs G.Symes, A.Taylor, G.B.Thompson, H.A.Thornhill, J.D.R.Vernon, Mr and Mrs G.Walker, Miss J.B.Webb, W.E.Wheeler, M.E. White, J.White, R.G.Williams.

Check list names and numbers are taken from Corbet (1969), except that the names 'ship rat' and 'common rat' are preferred as black and brown varieties of both these species occur.

I. HEDGEHOG. Reports of 21 seen alive and 59 dead on roads included sightings from 23 new 1 km. squares. Most sightings (27%) were in July. Animals which should have been hibernating were seen in January on 20th (JBW) and 29th (MEW), then none were reported until 22 March (DS). Latest reports were in December on 1st (AFJ) and 5th (RCL). Apparent juveniles were reported on 17th November (EJL) and 25th November (RAB). There were instances of 2 animals found killed only a few yards apart in both April (RGS) and August (AFJ). Only one nest site was noted (RAB), that was under a compost heap in a garden in July.

2. MOLE. A new 10 km. square record for SS 83 (RGS). 61 records of mole hils and 2 of dead animals included 20 new 1 km. square records.

3. COMMON SHREW. New 10 km. square record for ST 73 (EWP), 21 new 1 km. squares. A nest with young (litter number not determined) found under a corrugated iron sheet in late July was the first breeding record of this species we have received (JW).

4. PYGMY SHREW. New 10 km. records for ST 78 and 89 (AFJ) and 79 (MEK). A female which died in a trap in June had been suckled on 6 nipples.

5. WATER SHREW. New 10 km. record for ST 44 (RS), this being a specimen found dead with a hole in its side, as if speared by a heron.

8. GREATER HORSESHOE BAT. 5 seen alive (2 ringed) in a man-made tunnel in April, and 5 (3 ringed) in a church in August.

12. NATTERERS BAT. A specimen found dead on the floor of a barn (AFJ, RGS) was a new 10 km. record for ST 87 (Wilts).

18. NOCTULE. Dried remains from a building (WAW) constituted a new record for ST 54.

19. PIPISTRELLE. 10 were suffocated by smoke when a faulty boiler was tested. One found dead (PI) was a new 10 km. square record for ST 46. These specimens were checked critically against the possibility of being *P.nathusii* (Stebbings 1970) but one caught by a cat on 27th November (JH), and which subsequently recovered and was released must be recorded as a new 10 km. square record for ST 69 for *Pipistrellus* species, probably *P.pipistrellus*.

21. COMMON LONG-EARED BAT. New 10 km. square records for ST 51 (BS) and ST 54 (WAW), (ident. RGS), and ST 77 (EJL-indent. confirmed RES). Tissues from this last specimen were analysed at Monks Wood Experimental Station and the liver was found to contain 2.30 ppm DDE, a concentration which was not expected to have had any direct cause of death but which it was considered could have been a contributing factor.

24. FOX. Most records were in April (19 sightings), February (15) and June (12). Foxes were heard calling on 29th November (AFJ) 30th November and 2nd December (RCL). A pair was watched mating on 2nd February (RA). First cubs were reported in May on 11th (4 cubs - AT), 12th ("3 small cubs away from earth" - PF), 21st (2 "very small" - HRH) and 31st ("one of 12-14 weeks" - AFJ). Numbers of cubs sighted were singles (4 reports), two cubs (4 reports), 3 (3 reports), 4 (2 reports) and 5 (2 reports). A "family party" of 7, described as 1 adult, 3 large cubs and 3 small cubs was seen on 3rd June (RA). Many foxes were sighted in urban areas but few details of sites of earths are available.

27. STOAT. Records included a description of 2 chasing, leaping and rolling over one another on 7th July (JH), and one which took a 5-week old gosling by its neck even though the observer (JH) was only a yard or two away. It was persuaded to release the bird which recovered but the stoat would not be frightened away. The gosling had been nearly able to walk about with the stoat attached to it and it seemed doubtful if the stoat could have taken it away if it had managed to kill the bird.

28. WEASEL. 2 were trapped in Longworth traps. Another found dead but still warm was heavily parasitised, 120 biting lice (Mallophaga) being removed mainly from the shoulder region.

30. AMERICAN MINK. New 10 km. square ST 57 (MAFF). An adult was watched carrying 1 young by the scruff of its neck on 8th June (HRH). Young was 1½ times the size of a field vole and was several shades paler than its parent.

31. BADGER. 23 animals were reported dead on roads, some in each month with no significant peak of numbers. Some of these corpses were sent to MAFF veterinary laboratories for examination for bovine tuber-

culosis. Neal (1974) gave a general account of the T.B. situation and Muirhead and others (1974) published the results of their veterinary investigations between 1971 and 1973. The Badgers Act 1973 came into force on 25th January 1974 and a complaint under it alleging "cruel ill-treatment" was made following a MAFF demonstration of methods of controlling badgers. A police investigation concluded that there was no case to answer, and a private prosecution over the same allegation, heard early in 1975, failed.

Reports were received on 69 setts, particularly from M.G. Harris who contributed 40% of the badger records. He noted that at 7 setts he watched in 1974 there was no evidence of cubs, despite occupation by up to 5 adults, and cubs having been produced in the previous year or two. Numbers of cubs reported in litters were 3 (MGH) (RGS + CS) and 4 (MGH), the earliest specific date being 16th April. There were several reports of setts having been dug out or apparently illegally gassed. A sett which had been partially excavated mechanically in the summer of 1972 was reoccupied by March 1974 (AFJ).

32. OTTER. Recorded from Somerset, with a 1972 record received for Gloucestershire. A second report on the status of the otter in Britain was published (Anon 1974). This was based on figures supplied by otter hunts and concluded that for the two hunts which cover - occasionally - parts of the Bristol district, there had been little or no change in the status of the otter over the four years 1968 - 1971.

34. GREY SEAL. 1 sighted off Brean Down on 24th May (RA).

42. RED DEER. Following unconfirmed reports of escapes of this species from Whitcliff Park, Berkeley, R.A. Burberry saw a stag and two probable hinds, slots, droppings and a wallow in woodland about 1 mile away. This is a new 10 km. square record for ST 69. Fallow deer have also been rumoured to have escaped but none have been confirmed.

45. ROE DEER. D. Shaddick sent in a number of observations on this species at Stockhill Plantation, he thought he could account for at least 4, possibly 5 being present. R. Angles' report of one seen on Shapwick Heath was a new 10 km. square record for ST 44.

53. BROWN HARE. New 10 km. square record for ST 24 (JBW). A female shot on 21st October was found to be in milk and carrying young (RGW). A pair was seen mating on 3rd August (RMC), and 13 hares were seen on the banks of the River Axe in the spring (RA).

55. RABBIT. Few estimates of populations were made, 14 adults were seen in 100 acres in February near Olveston (RGS). Myxomatosis was reported only from Winterbourne, in February (AFJ). Juveniles were reported on 27th March ("very young"), May ("young") and 10th August ("young"). An adult watched excavating (AFJ) came out backwards and flung earth back between its hind legs using its fore paws, then turned and pushed loose earth forwards using its chest and fore legs.

57. GREY SQUIRREL. Groups of 5 and 7 together were seen on 3rd and 24th March (AFJ) but only 1 juvenile was reported, sighted on 23rd June (EJL). Squirrels on Brandon Hill were very tame, going within 2-3 feet of people for food (MJ). Those feeding on sycamore 'keys' were seen to eat the seeds and leave the empty seed cases (AFJ), whilst one feeding on hawthorn berries was seen to neatly halve a berry, eat the seed and drop the two halves "at such speed that the pieces made a steady patter on the herbage below" (HRH).

59. DORMOUSE. New 10 km. square records for ST 56 (MRH, PJD) and 68

(EJL). 1 jumped out of a bird nest box in June (DWB) and another possible leapt from a box put up specifically for small mammals (GW). Animals were found in hibernation on 25th January (MHR, PJD) and 15th December (CEDS + BCC). Non-breeding nests were found at 2 locations during the Mammal Section's first dormouse survey meeting. Robert Surch has been studying the differences between the ways in which bank vole, woodmouse and dormouse gnaw nuts and is now able to identify convincingly a good majority of dormouse-damaged nuts.

61. HARVEST MOUSE. New 10 km. square records for ST 35 (JBW), 65 (EJL), 79 (AFJ), 89 (EJL, RFH, MB). Most records were of nests, except 1 animal caught by a cat (JBW) and 1 caught in a Flap trap (AFJ). Young were reported only in September, when there were at least 2 alive in one nest and 8 dead in another (AFJ), and an adult and at least 2 live young were in a third (RGS).

62. WOODMOUSE. New 10 km. square records for ST 73 (EWP) and ST 79 (FN). Animals were trapped, remains were found in bottles and barn owl pellets, some were caught by cats and 1 was seen alive on the M32 motorway. A young female was trapped on 18th August (MSFM), and 2 mice were disturbed on 2 separate occasions from old birds nests in trees, one at 15 ft., one at 6 ft.

63. YELLOW-NECKED MOUSE. The only record was of one seen in a house at Cheddar (AB).

64. HOUSE MOUSE. New 10 km. record for SO 70 (FN). Skulls of this species were found in pellets of barn owl (AFJ) and tawny own (JB).

65. SHIP RAT. *Rattus rattus*. Still present in Bristol and Avonmouth (RGS).

66. COMMON RAT. *Rattus norvegicus*. Up to 10 adults reported emerging from badger setts (MGH).

67. BANK VOLE. New 10 km. square records for ST 79 and SO 70 (FN). Specimens were trapped, and remains found in bottles and barn owl pellets.

68. WATER VOLE. Sightings included 1 "half-grown" animal seen on 19th August (RMC).

69. FIELD VOLE. New 10 km. records for SO 70 (FN) and ST 78 (AFJ). Nests were found, animals trapped and skulls found in bottles and barn owl pellets.

32 species of mammals were recorded in 1974, the highest total (excluding stray 'exotic' species) we have had in one year. No Cetaceans (whales, dolphins etc.,) were seen. The Mammal Society's national survey finishes at the end of 1975, it is hoped that members will note all mammals seen during the year, and in particular that they will record details of successful breeding.

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AVON BIRD REPORT, 1974

COMPILED BY THE EDITORIAL COMMITTEE OF THE
B.N.S. ORNITHOLOGICAL SECTION

P. J. CHADWICK G. E. CLOTHIER
H. R. HAMMACOTT G. SWEET
S. M. TAYLOR J. D. R. VERNON

THE PAST. On this first appearance of a report with the above title it seems right to review the history of bird recording in the area it covers. Periodical recording started locally in 1912, with 'Notes on Somerset Birds', produced by the Ornithological Section of Somerset Archaeological and Natural History Society. Since its issue for 1918 this has appeared annually, with two slight title changes. The 1923 report divided the county into seven districts, of which No. I was North Somerset, with B. W. Tucker as its recorder.

In 1936, H. H. Davis inaugurated 'Bird Notes, Bristol District', later the Bristol Bird Report, in the Proceedings of Bristol Naturalists' Society. It dealt with the area round Bristol of chief concern to B. N. S. members - that is, south Glos. up to the New Grounds, covering this area by a bird report for the first time, and north Somerset, roughly District I. It too has appeared annually.

In 1963 the North Glos. Naturalists' Society, with B. N. S. co-operation, launched the Glos. Bird Report, covering the whole of that county. The B. N. S. report area was now completely covered by one or other county report, but the report continued as a service to the Society's members.

With the advent of the new Administrative Counties, the N.G.N.S. decided that the Glos. report should confine itself to the new area of the county, omitting the part that was to become north Avon. The Somerset Society, however, decided to continue coverage of its traditional area, including the part destined to form south Avon.

A national conference of bird report editors met in Bristol on Nov. 3, 1973 to consider general problems posed by the new county structure. It recommended that any changes in report areas should take effect from Jan. 1, 1974 although the county changes did not take legal effect until April 1; and that complete omission of areas or overlapping of reports should be avoided where possible.

On Dec. 8, 1973 a meeting of local societies, convened by the B.T.O. Regional Representative, considered the production of an Avon Bird Report as a separate publication. All welcomed the idea in principle but the practical difficulties - principally financial - appeared to be insuperable. The Somerset Society held to its decision to include south Avon in its future reports, but modified the boundary of its District I to coincide exactly with the new Avon - Somerset boundary. Thus for 1974 onwards District I will represent the overlap with Avon exactly, which should help liaison and future research.

THE PRESENT. So that the new county might be covered by a single bird report from its inception, the Council of Bristol Naturalists' Society agreed that the Bristol Report should restrict its attention to the Avon area and be renamed the Avon Bird Report. This does not prejudice the eventual production of the report as an independent entity should this ever become feasible in future. For readers of the Bristol Report the effect of the change is the loss of data on much of S. Glos., including the New Grounds, and on part of north Somerset, including Brean Down, Cheddar Reservoir and a part of Mendip. We plan to include some news from these areas in our Forewords. In exchange we now have a clearly defined county area and a chance of increased co-operation with other bodies inside it. We are grateful to Bristol Ornithological Club and to Bath Natural History Society for use of material, and to Somerset for exchange of records as for many years past.

THE SYSTEMATIC LIST. The order of species, and the vernacular names used, are those given in 'A Species List of British and Irish Birds', prepared by the B. T. O. Report Editors' Committee at the request of the 1971 Report Editors' Conference. Scientific names will not be given in the list except in special circumstances. In presenting the data we have divided the county into two parts, separated by the line used formerly to divide the Glos. and Somerset report areas and also the G and S parts of the Bristol area. This is the centre-line of the R. Avon inland to Swineford and then the old county boundary to the Three Shires Stone. North Avon (NA) consists of Northavon, Kingswood and most of Bristol, and South Avon (SA) of Woodspring, Wansdyke, Bath and the part of Bristol south of the R. Avon. This division was made to assist in comparisons with past reports; but it has also emphasised the comparatively sparse nature of the data on North Avon, which will, we hope, lead to increased observation there.

THE YEAR. January and the first three weeks of February were very mild, wet and unusually windy, with S. - S.W. winds of gale force on thirteen days, and storm force winds on the coast at times. Seabirds driven inland included a Great Skua and a Black-throated Diver at Cheddar Reservoir, Somerset, in January. There was some flooding, particularly from Feb. 8 - 16th. No large-scale Lapwing movements were noted, and Redwing and Fieldfare flocks were small, consequences of the mild weather over Europe. Very large numbers of Wigeon and Teal visited Britain - Teal set a new record - and counts on the S. Avon reservoirs were high.

From Feb. 22 the weather was calmer and still generally mild, though the last few days and the first half of March were cooler, with easterly air flow, some night frosts and occasional sleety showers. There was a spell of westerly weather in the third week of March, then pressures rose again and from the 22nd winds were light S.E., and fog was rather persistent. Several Glaucous and Iceland Gulls were recorded in Britain, at least one of each in S. Avon. A Wheatear at Sand Point on March 5 and a Cuckoo at Congresbury on April 4 were the first reported to 'British Birds', and other very early summer visitors were a Whinchat at Pensford and a Garden Warbler at Doynton, on March 19 and 24 respectively.

April was cold and dry with mainly N.E. winds, which delayed the main migrant arrivals. Later in the month and in early May there was a heavy passage of Little Gulls and Common/Arctic Terns. May opened cold and rather dull, with a 'low' over central Europe, but low pressure from the Atlantic brought heavy rain from the 9th - 12th and the rest of the month was dry with sunny spells. June's weather was variable, with an unsettled start then warm and dry periods and a cool, wet end. A pair of Long-eared Owls reared two young in a conifer plantation near Priddy, Somerset - a notable event. Nightjars were present nearby, but it is not known whether they bred.

July was cool and unsettled, with heavy thundery rain at times. August was similar, but ended with a calm spell. There was a large passage of Green and Common Sandpipers at mid-month and of Ruff and Greenshank at the end. September was one of the coldest since 1900, with heavy rain spells and very few fine days. Severe gales in the first week brought seabird records from the coast and inland; these included a Sooty Shearwater at Aust, Storm Petrels, Gannets, several Arctic Skuas and, at Cheddar, another Great Skua. Two Grey Phalaropes were recorded in S. Avon. There was a large passage of Black Terns, mainly on the coast, in late August and early September; and another in mid-month, more noticeable inland. Some 120 were over Chew Valley Lake on the 11th, and with them was a White-winged Black Tern, the seventh record of the species from the area of Avon.

October was cold, with frequent showers and some heavy rain, and fresh or strong winds. Winter came early over S. Europe, and many Swallows perished in the Alps while on migration. Unsettled weather continued for much of November. Three Curlew Sandpipers at St George's Wharf and one at Frampton on Severn, Glos, were among the few noted in Britain in October, and late summer migrants included a Redstart seen at Congresbury on Nov. 3rd. December's weather was quiet except for some boisterous days around the 10th, and was very mild, with temperatures in the 50's F. during the last week.

So ended another year with no really hard weather, leaving Wrens, Long-tailed Tits and Goldcrests at very high numbers. Among summer migrants, Whitethroats were still far from their old levels and Redstarts very scarce indeed. Spotted Flycatchers showed signs of recovery. On Nailsea Moor, 1973's pair of Reed Warblers had several successors, but Sedge Warblers were less abundant.

At the New Grounds, Glos., the peak count of White-fronted Geese was 4,500 on Jan. 20, and the last birds left on March 14th. An adult Lesser Whitefront wintered there. At least 530 individual Bewick's Swans were recognized by their bill markings. An Avocet was seen on July 12, and a Cattle Egret on Aug. 20; two Peregrines were present in September and one regularly thereafter. The first Whitefronts returned on Oct. 9 and the first Bewick's Swans on the 21st. At the year-end, 1,265 Whitefronts were present and 180 Bewick's had been recognized individually.

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BLACK-THROATED DIVER

SA One with a Great Northern Diver at Chew Valley Lake on Nov. 21 remained at least to Dec. 8 (RMC, AJP, KEV and others).

GREAT NORTHERN DIVER

SA Chew Valley Lake: one present from Oct. 26 to late November, two on Nov. 24 and 28th, three on Dec. 8 and 14th, and up to four from Dec. 15 to 19th.

GREAT CRESTED GREBE

SA Up to 39 at Barrow Gurney reservoirs in January, and up to 31 in October and November; but at Blagdon the highest count was eight in early April. At Chew Valley Lake up to 190 were present from January to March; the breeding season was good (96 young seen), the water level being high; autumn counts usually 300 - 350, but more from late October to mid-November (largest count 456). Pair bred at Litton reservoir, but young were lost when the water was drained.

BLACK-NECKED GREBE

SA One at Chew Valley Lake, April 4, and a pair on 6th and 7th.

LITTLE GREBE

NA Breeding was reported at Hoar Gout, near Avonmouth.

SA Breeding was reported from Blagdon, Chew Magna, Chew Valley and Litton reservoirs, Portbury and the R. Avon at Hanham.

FULMAR

SA Reported regularly from Weston-s-Mare area, from April to September. Most records were of one or two birds, the largest group being five off Sand Point on June 6 (RA, TB, BLK and others).

MANX SHEARWATER

NA Seldom seen, but 15 were noted off Chittening on June 22 (NTL) and at least five off Aust during storms on Sept. 7 (RGT).

SA Large numbers were seen off Weston-s-Mare, May 16 to early August (RA, TB, BR) and a few during storms, Sept. 6 - 8th. Largest counts from Brean Down were 158 on June 22; 350 on July 3, and 270 next day; 54, Aug. 4th. Counts from Sand Point included 26 on May 16, 88 on 23rd; 111 on June 6th, 74 on 18th and 182 on 23rd; 34 on July 3rd and 44 on 9th; 33, Aug. 13th. One, Chew Valley, Sept. 29th.

SOOTY SHEARWATER

NA One off Aust in storm, Sept. 7 - seen intermittently for three hours by RGT, who supplied conclusive details. This is the third record from the area of the new Avon County - see Proc. BNS, 1972.

STORM PETREL

SA Single birds were seen off Brean Down on July 3 and Sept. 8; and off Sand Point on Sept. 3, with three on 8th (RA, TB, BR).

GANNET

NA One reported off Avonmouth on Sept. 8 and two off Severn Beach on 7th and 8th. One was found dead at Chittening on Aug. 14th.

SA As in 1973, few were reported, most off Weston-s-Mare. The largest counts from Brean Down were 11 on June 22, 12 on July 3 and six on Aug. 21st. From Sand Point, three on July 3 was the largest count until after the storm on Sept. 7, seven being seen on the 8th. One was found dead at Chew Valley Lake on July 25th.

CORMORANT

NA More frequently reported than usual, perhaps through increased coastal watching: usually in ones or twos, but 23 were seen off Chittening on Aug. 24 and three there, with five more off Northwick Oaze, on Nov. 16th.

SA Numbers at the Denny I. roost, Chew Valley Lake, remained at 50-55 early in the year; two or three were present in summer; the roost re-formed in September and reached a record total of 64 on Dec. 31st. After storm on Sept. 7, twenty were feeding in Sand Bay and ten at mouth of R. Avon on 8th. One count received from Steep Holm - 88 on July 6th.

SHAG

SA Single birds were seen off Clevedon on May 22 and off Brean Down on July 29 (JFB, BR et al.). One off Brean Down, Sept. 4, one on 6th, two on 8th and three on 10th; 9 off Sand Point on 6th and one at Blagdon reservoir on 7th - a total of 17 (RA, TB, AM et al.).

GREY HERON

SA The table gives the total of nests within the area of the new Avon county for the last five years.

Heronry	1970	1971	1972	1973	1974
Uphill	7	9	8	13/15	14
Cleeve	57	56	?	48	49
ston Moor				1	
ortbury				3	5
Newton Park	19/21	10	20	11	17
Avon Total	83/85	75		76/78	85

BITTERN

SA The only record was of one seen at Chew Valley Lake on Jan. 12 by AHD and KEV.

MALLARD

SA Some 2,000 in the area, mid-January, but only 1,000 a month later. Reports of 64 nests or broods, from 14 localities. There was much movement among the reservoirs in August and September (Blagdon counts varying by 700 on successive days) but total about 2,100; decrease to some 1,000 in November and 1,350 in December.

TEAL

SA Generally small numbers on the coast: up to 60 at each of Axe Estuary, Sand Bay and Portbury Wharf in January - February, when the reservoir total was very high (2,200 - 2,400). A few moved to the reservoirs in June - July, increasing in late August with a peak of c. 1,000 in September, falling to 650 - 700 by end of year.

GARGANEY

SA The only spring records were of a pair at Chew Valley Lake on March 24, two pairs on 31st, a female on April 6 and single males there on May 18 and at Blagdon reservoir on the 25th. Up to three were present at Chew Valley Lake, August 2 - 15th, then one or two to Sept. 18th. Single birds present, Blagdon reservoir, from August 23 to September 11th.

GADWALL

SA Six records from Barrow Gurney resrs. (maximum of six on March 10); two off Portbury Wharf, March 16; a male off Brean Down, Aug. 30. After a successful breeding season (two broods seen at Blagdon and 20 at Chew Valley) there were high counts at the reservoirs with a maximum of 231 at Chew Valley Lake on Aug. 20 (including a flock of 221 on the Mill Pond, Herriots Bridge) and 160 - 170 at Blagdon in September, in which month Chew Valley counts were variable between 28 and 132.

WIGEON

NA The largest coastal counts were all in North Avon: 20 off Severn Beach on Jan. 26 and seven there on Nov. 30; six off Aust on Sept. 21 and four at Chittening on Oct. 19th.

SA The highest reservoir counts were 248 at Blagdon and 1,170 at Chew Valley, both on Jan. 12; numbers then varied, with totals of 855 on Feb. 16; 1,060 on 24th; and 535 in mid-March. A male seen at Chew Valley on May 19 and one on July 28 may have been the same bird summering there. The first autumn birds appeared in mid-August, but the first large counts were 185 at Blagdon and 711 at Chew Valley in mid-December. One female was reported from Barrow Gurney reservoirs on Dec. 29 - the species is now rarely seen there.

PINTAIL

NA A pair, Northwick Oaze, Dec. 1 and one off Chittening on 14th.
SA Reservoir total about 55 in mid-January to late February, but only 14 in mid-March; eight still present on April 6th. The first autumn birds seen were two at Blagdon on Aug. 3, but few were in the area until mid-December, when 53 were counted (52 at Blagdon). The only coastal record was of two at Sand Bay on Sept. 19th.

SHOVELER

SA The area total of 600 - 650 in Dec. 1973 fell to 350 early in January, to 255 on the 12th and 145 by mid-February; usually some 50 - 60 present in March and April but 100+ occasionally reported from Chew Valley Lake. About 175 seen in late August and September (though 455 at Blagdon on Sept. 5 - KEV); 50 or so in October, 250 on Nov. 16 and 100 - 125 in December.

MANDARIN DUCK

SA A female, Chew Valley Lake, Apr. 1 (JRG) and 3rd (JB).

RED-CRESTED POCHARD

NA A female on St George Park lake, Bristol, Sept. 17 (RLB).
SA A party of five (3 males) at Chew Valley Lake, March 10 (PJC, RNC, ML) and one there, Aug. 18 to Sept. 25 (RMC, KEV et al.).

SCAUP

NA One off Chittening, April 27th.
SA Two males at Blagdon reservoir, Jan. 1; a male at Chew Valley Lake, Feb. 24 - April 19, but five (3 males) on April 6 and three on 15th and 20th; two females on 27th. One at Barrow Gurney resrs., Feb. 24 - April 11th. Seven off Brean Down, March 3, flying N.E. One autumn record - a male at Chew Valley Lake, Dec. 18 - 21st.

TUFTED DUCK

SA Fairly high numbers present early in the year, with maximum of 750 at the reservoirs in mid-February; about 550 in March and some 700 in April. The highest autumn total was 415 in mid-December. Bred at Blagdon (2 broods) and Chew Valley (25 broods).

POCHARD

SA Present in every month, but no reports of breeding. Reservoir counts suggest total of 550 in January, 450 in February, 360 in Marc but only 40 or so from April to June. In late June and July numbers increased to 135, then to some 260 from August to October, with a rapid rise to 825 in mid-November and 925 a month later.

GOLDENEYE

SA Some 35 - 40 present in January and February, but c. 65 in late February and early March (40 twice reported from Chew Valley Lake); then decrease to a maximum of 23 in April; five still in the area on April 28 and one on May 5th. The first autumn report was of two at Blagdon and one at Chew Valley on Oct. 12; then numbers rose slowly to 16 in mid-November and 40, late November to the end of the year.

LONG-TAILED DUCK

SA A female was present at Chew Valley Lake, January to March 24th.

COMMON SCOTER

NA One was reported off Severn Beach on Nov. 17th.

SA Passage movement from April 12 to 20th, with counts of up to seven (on 12th) at Chew Valley Lake, four at Barrow Gurney resrs. on 20th, three in Sand Bay on 14th and one in Weston Bay on 16th. Most other records were from Weston and Sand Bays, covering all months except February, March and May. The largest count was seven, off Brean Down on July 29th. Single birds were noted off Portbury Wharf on Feb. 3 and March 17th.

EIDER

SA The only records were of a male off Brean Down on May 4 and a pair in the same area on the 8th.

RUDDY DUCK

NA One off Chittening on Nov. 23 and again on Dec. 1 (RGT).

SA Very large numbers were again present at Blagdon reservoir early in the year, with 107 on Jan. 19 (BR) and 100, Feb. 24 (PJC); no more than seven were seen at Chew Valley Lake in this period, but at least six pairs summered there and at least one pair bred - nest with five eggs found (DW) and one young seen later. Rapid increase at Blagdon in autumn, with 50 on Nov. 2 (BLK), 70 on 17th (DS) when only one or two at Chew Valley, and maximum of 92 on Dec. 14 (AM); only five at Chew Valley Lake on latter date (RMC).

RED-BREASTED MERGANSER

SA An adult male, Chew Valley Lake, March 24 (PJC, BLK) and two, female or immature, there from November 10 - 24th (PJC, WJH).

GOOSANDER

SA All reservoirs counted on few days; data suggest usually fewer than 30 birds in the area, January to March, though 44 were reported at Chew Valley on Jan. 2 (23 on previous day) and 35 on March 16th.

One was still at Barrow Gurney resrs. on April 17 and two at Chew Valley on 18th. Three at Chew Valley on Nov. 2 and up to 12 by the end of the month; 21 on Dec. 14 and 28 (maximum) on 21st. The only autumn record from elsewhere was of ten at Blagdon on Dec. 24th.

SMEW

SA Blagdon reservoir: a male in January; two males, Feb. 10; one male and two females on 24th, then one male until April 9; one male was again present on Dec. 7th. At Chew Valley Lake a pair were present on March 3 and a female on 31st; another 'brownhead' from November 10 - 30th, a male from Dec. 8 - 31st (probably the bird from Blagdon) and also a female on Dec. 29th.

SHELDUCK

NA Some 100 present in early May; about 25 young reached coast.

SA Coastal survey from R. Avon to Birnbeck Island: population in early May c. 290; breeding season good (about 226 young reached the coast) and again prolonged - the first young were seen on May 25 at Portbury Wharf (TBS) and four small young were seen in Sand Bay on Aug. 18 (JB). Noted at Chew Valley Lake in every month except August to October, with most in January and February - maximum of 20 on Jan. 27; two pairs bred (10 and 8 young, but none survived very long). Up to eleven recorded at Blagdon reservoir in January, and the species noted there in March. One was present at Barrow Gurney reservoirs on Dec. 1 (AM).

GREYLAG GOOSE

SA One, probably not genuinely wild, was present at Chew Valley Lake from Nov. 16 to the end of the year.

WHITE-FRONTED GOOSE

SA One at Portbury Wharf, Jan. 1; six, Sand Bay, Jan. 3, three on 24th, 14 on Feb. 6 and one on Nov. 28; six were present at Chew Valley Lake in January and February; one at Kingston Seymour coast on March 23 and one at Clevedon on April 7th.

PINK-FOOTED GOOSE

SA Two were seen at Chew Valley Lake on Dec. 9 (CVRS).

CANADA GOOSE

SA Up to five were present at Chew Valley Lake, January to April 19; a pair reared four young, and a younger pair also summered. From July 9 to the end of the year, eight were present. Three were noted at Blagdon reservoir on March 23rd.

MUTE SWAN

NA About 40 wintered in Bristol city docks, and 44 were present at the close of the year, but no summer records were received.

SA Some 80 to 100 were present at the reservoirs in summer – from 20 to 46 at Blagdon and 43 to 84 at Chew Valley – no concurrent counts were received. Breeding reports from Kenn and Nailsea Moors.

WHOOPER SWAN

SA A party of eight (three juveniles) was seen at Blagdon res. on Dec. 7 by JTL, who had good views of the bill markings.

BEWICK'S SWAN

NA One at Oldbury on Severn, Nov. 17th.

SA Three at Blagdon reservoir in January (but six on 24th) and one on Feb. 16; one at Chew Valley Lake on Jan. 27 and three on Feb. 16th. Four at Blagdon, Dec. 7; all other autumn records came from Chew Valley Lake: four on Dec. 8; ten on 9th, then up to eleven to the end of the year.

BUZZARD

NA Breeding-season records only from Cromhall, single birds seen over Blaise Woods, Bristol on May 26 and Filton on 17th. Records from three areas out of breeding season.

SA Breeding-season records from Bleadon Hill area (breeding was proved), Compton Dando, West Hill (Wraxall), Clapton-in-Gordano, Flax Bourton area, Rickford, Hinton Charterhouse, Marksbury and North Stoke. Records from 13 areas out of breeding season.

SPARROWHAWK

Reported from thirty localities (eleven in NA) during breeding season, but evidence of breeding was rarely reported.

MARSH HARRIER

SA One, an all-dark bird, flew to N.E. over Portbury Wharf at 07.30 hrs., April 22 (TBS).

OSPREY

SA One was seen over Chew Valley Lake at mid-day on Sept. 4; it was watched for five minutes by KEV, who supplied a full description. The bird left to the S.E.

HOBBY

Pairs or multiple records of single birds at four SA areas in breeding season. Singles also reported from four other areas (two in NA). First seen, May 19; last, an immature bird, Oct. 12th.

PEREGRINE

NA An immature bird was seen at Chittening, Sept. 14 (CJB, PDB). SA A female, Chew Valley Lake, Jan. 7 (GSu); one, Sand Bay (JB) and 1st-winter female, Anchor Head, Weston (RA) on 13th; male, Axe Estuary on 19th (RA); one over Sand Point, May 11 (TB). One at St George's Wharf, Oct. 13 (WGB); a female, Middle Hope, Nov. 23 (TB).

MERLIN

SA Single birds present at Axe Estuary, Sand Point and Portbury Wharf in January, February and October - December. Late summer records from Sand Point area, July 5, 9th and 20th (RA, TB). Inland records from Churchill, Oct. 12 and Chew Valley Lake, Dec. 15th.

KESTREL

Widespread resident; records from 110 1-km squares (30 in NA) during breeding season and from 60 more (18 in NA) at other times. Records within Bristol city boundary fall into groups suggesting c. 12 pairs resident - three nests located (all in SA). Many records came from motorways and along main roads.

RED-LEGGED PARTRIDGE

NA The only report was of three near Almondsbury, Feb. 10 (RB). SA Breeding-season records of pairs from Norton Hawkfield, Queen Charlton and Marksbury Plain. A few other records of single birds.

PARTRIDGE

NA Only records received: a pair at Marshfield on June 3 and a covey of ten, Oct. 15; one at Dyer's Common, near Pilning, June 8; one at Chittening, July 30; a dead juvenile at Patchway, Sept. 11th. SA Regularly seen at Portbury and St George's Wharves (four young at former, June 30). Pairs also seen in breeding season at Norton Hawkfield, Wavering Down and the Middle Hope area.

QUAIL

NA One or two calling, Marshfield, June 3 (RMC). This was the only report received of this very local summer visitor.

WATER RAIL

SA One or two seen regularly at Portbury Wharf, Jan. - May 5 and at Chew Valley Lake, Jan. - April 12; at latter place, one or two also from July 30 onwards, with up to ten from late October to end of year. One found dead in roadside gutter, Nailsea, Oct. 11th. Occasional winter records from Uphill, Bleadon area and Sand Bay, where seven flew from Spartina at high tide, Jan. 13th.

MOORHEN

Common, resident on all suitable waters.

NA Breeding reports received only from Hoar Gout, Avonmouth and from the lake, St George Park, Bristol.

SA At least 22 pairs in breeding season, Chew Valley Lake; eleven broods (20 young) seen. Largest count here was 88 on Sept. 8; other large counts were 17 adults and three young at Blagdon reservoir in July, and 14 adults with two young at Portbury Wharf on Aug. 14th.

COOT

NA Breeding records from Hoar Gout, Avonmouth and from Horton.

SA Some 64 broods (120 young) at Chew Valley Lake, but only four broods (4 young) at Blagdon reservoir. No breeding at Barrow Gurney reservoirs. The table gives monthly maximum reservoir counts.

	Jan	Feb	Mar	Apr	July	Aug	Sep	Oct	Nov	Dec
Barrow	85	81	77	27	42	69	97	58		
Blagdon	117		253	407	348	980	1295			1097
Chew V.	192	484	425		1259	1609	882	283	270	278

OYSTERCATCHER

NA Up to three at Chittening and Severn Beach, January to May 3 and Aug. 2 to end of October, then up to eleven in November and December. Two at Littleton on Severn, Aug. 4th.

SA Present on coast, Jan. 1 to May 10 and July 1 to December, with largest counts of 31, Sand Bay, Jan. 3 and 85 on Aug. 17; 65, Axe Estuary, Feb. 23 and 124 on Sept. 8; ten, St George's Wharf, Nov. 17th. Up to three at Blagdon and Chew Valley reservoirs, July 23 to Nov. 1, with nine at the latter on Sept. 11 and 12th.

LAPWING

NA 300 at Filton, Jan. 16th. Only breeding-season record was received: from Cromhall, Apr. 28th. Autumn flocks: 75, Northwick Oaze, July 27 rising steadily to 600, mid-November and 1,000 at end of year; 250, Rangeworthy, Aug. 24; 240, Littleton on Severn, Oct. 3; 500, Westerleigh Common, Nov. 20 and 150 at Filton, Nov. 22nd.

SA Breeding proved* or suspected at Yeo Estuary; Nailsea*, Kenn* and Hillsea Moors; Wraxall*, Marksbury Plain, Norton Hawkfield*, Queen Charlton*, Clutton* and Chew Valley Lake. The largest winter counts were 2,000 at Axe Estuary, 1,200 near Clevedon and 150 at Blagdon reservoir in January, and 500 at Chew Valley Lake in February. Autumn flocks recorded from June 29, with largest counts of 500 at Chew Valley Lake in July, rising to 1,000 or more by the end of the year; 750, Blagdon res. in August; 1,800 at Axe Estuary in November and 1,500 near Clevedon in December.

RINGED PLOVER

NA A dyed and colour-ringed bird seen at Severn Beach on Sept. 8 was one of a number marked at King Oscar Fjord, E. Greenland, in June. Another appeared at the same time at Steart, Somerset.

The table shows monthly peak counts in main areas:

(a) Sheperdine to Oldbury; (b) Oldbury to Littleton; (c) Severn Beach to Chittening; (d) St George's Wharf; (e) Clevedon to R. Yeo; (f) Sand Bay; (g) Weston Bay and Axe Estuary; and reservoirs: (h) Barrow Gurney; (k) Blagdon; (l) Chew Valley Lake.

	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(k)	(l)
Jan.			50			40				1
Feb.			50			48	40			
March			14			120				
April			40	6		20				
May			150	18	7	40				1
June			117		6	55				
July			11			33				1
Aug.	120	70	300	24		210	141		12	70
Sept.			500	183		320	220	3	19	114
Oct.			75	2		85	60			
Nov.	40		60			55	50			
Dec.			51							
		NA					SA			

LITTLE RINGED PLOVER

SA Single birds were present at Chew Valley Lake, April 21 to May 17 and at Blagdon reservoir on May 9th. At Chew Valley, two adults and at least two immature birds were present in July, then several parties of up to 7, mostly immature, in August; last seen, one on Sept. 6th. [At Cheddar reservoir, Somerset, four were present in April, and at least nine individuals in July and August.]

GREY PLOVER

Markedly fewer than in 1972 or 1973.

NA Noted at Severn Beach, January - March (three), September (one and October (four); and at Oldbury on Severn (7 on Sept. 25 and 10, Oct. 3rd.)

SA Noted on coast in every month except June, mostly at Sand Bay, where up to nine were noted, January - February, eight in November and up to four in other months. Single birds at Chew Valley Lake on June 25 (DL) and Aug. 13 - 21st.

GOLDEN PLOVER

NA 270, Tormarton, Jan. 6; one, Littleton on Severn, Sept. 18; 250, Westerleigh Common, Nov. 20th.

SA Noted from January to March 15 and Sept. 8 to December; the only counts of 100 or more were from Nailsea and Tickenham Moors (up to 300) and the Axe Estuary (up to 500).

DOTTEREL

NA One, in winter plumage, was present at Severn Beach from Sept. 14th - 17th; it was so tame that RGT was able to record a detailed description from distances down to four feet. This appears to be the first record for the area covered by North Avon.

TURNSTONE

NA Present at Severn Beach and Chittening Warth up to June 9, and again from July 8 to December; peak numbers were 120 - 150, from August onwards, with some 200 on Aug. 20th. Smaller numbers from Oldbury to Sheperdine, with largest counts of 50 - 90 in autumn.

SA Present up to May 19 and again from July 17, with largest counts of 30 at Clevedon, January to April and nine in May; and of seven at R. Axe estuary in December. Noted at Chew Valley Lake from July 28 to Sept. 9; many small parties passed through, with a largest single count of eight in late August.

SNIPE

NA Parties of up to seven noted in Chittening and Aust areas up to April 11, and from Oct. 12 onwards; up to three at Littleton on Severn, Sept. 25 - Oct. 3; 70 at New Passage, Dec. 15th.

SA Probably bred on Walton, Weston and Hillsea Moors. Reported often, January to March and from July 29 onwards, at coast, moors and reservoirs, with largest counts of 150, R. Axe estuary, and 100 at Sand Bay, in January; 52 on Nailsea Moor in March; 105 at Chew Valley Lake in August; 100, Nailsea Moor, Sept. 14; 180, Axe estuary in November; and 70, Sand Bay and 200, Chew Valley Lake, December.

JACK SNIPE

NA Single birds at Chittening Warth, Oct. 22 and Nov. 16 - 30th.

SA Up to five at Sand Bay, January to March 10 and from Sept. 14 onwards, but 14 noted on Jan. 27 (JB). Six at Axe estuary, March 24th. Up to four in marshy area at Ashton Vale, April 24 - May 28th. Single birds at Chew Valley Lake in January and October, and at St George's Wharf in November.

WOODCOCK

NA One was seen at Stoke Park, Stapleton, Bristol on Dec. 15th.

SA Single birds at Weston Woods in winter and Lansdown in August.

CURLEW

Fifty-one records from NA, all from coast; and 45 from SA, nine of which were from Chew Valley Lake. Inland records of birds being heard at Kenn Moor, June 16 (SMT) and W. Nailsea, Aug. 27 (HRH). Counts (monthly maxima in main areas) are summarised in the table.

Key to localities: (1) Sheperdine to Oldbury; (2) Littleton to Aust; (3) Severn Beach to Chittening; (4) R. Avon (Sea Mills area); (5) St George's and Portbury Wharves; (6) Clevedon to R. Yeo; (7) Woodspring Bay; (8) Sand Bay; (9) Weston Bay and R. Axe Estuary; (10) Chew Valley Lake.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Jan.	25		150	25	21	97	35	224	200	2
Feb.		9	200	36	350	23	45	232	200	3
March	17		63	23	40	83	45	372	3	1
April	8		40		24	47				
May	1	1	10		16	26		11		
June	4		75		44	48		109		
July			126			8		120		5
Aug.			127					120		3
Sept.			100		6	30		224		
Oct.		150	145	14				200		
Nov.			60			50	27	180		
Dec.		130	75	33				265		
			NA				SA			

WHIMBREL

NA Up to three, Aust to Chittening, May 6 - 18th; two, Chittening, July 8 and one, Aug. 2 and 16th.

SA Thirty-two reports, April 7 - June 3, nearly all from coast and mostly of one - three birds, but several parties of 20 - 30, April 30 - May 8; one at Chew Valley Lake, May 5th. One, Portbury Wharf, June 15 and 23rd (WGB, TBS) may have summered there. Autumn passage from July 21 to Sept. 9, with fourteen reports of up to six birds, from coast and reservoirs.

BLACK-TAILED GODWIT

SA As in 1973, only small numbers noted. One, Chew Valley Lake, early January. Up to nine, Sand Bay, January to April 23 and July 24 to December, but 45 on Aug. 5 (TB). Six at Portbury Wharf, June 29 and two on Aug. 11 (TBS). Up to three at reservoirs, July 16 to Sept. 4th. Twenty-nine records received in all.

BAR-TAILED GODWIT

NA One at Severn Beach, March 24; five records of up to five birds Chittening Warth, April 12 - May 6, but 27 on May 3rd. One, Sept. 25th at Littleton on Severn, and one, Nov. 9, at Chittening.

SA Up to nine at Sand Bay, January to March 14; up to 17, there and at Axe Estuary and Portbury Wharf, April 18 - 22nd, and single birds in May. Up to three at Sand Bay, July 24 to December, with a flock of thirty on Aug. 5 (TB).

GREEN SANDPIPER

NA A pair at King's Weston marsh, Bristol, Aug. 3; one noted at Aust Warth, Aug. 17 - 24th.

SA Fourteen records, January to April 28, and twenty-six from June 22 to December, from coastal and a few inland localities; all were of single birds except for Portbury Wharf, where up to three occurred in April, August and September. Reservoirs: 18 records of up to four, Chew Valley, January to April 18; 80 records there, July 2 - Sept. 5, mostly of up to seven birds, but up to 15 from July 30 to Sept. 9, and exceptional numbers of up to 29, Aug. 9 - 16th; up to six at Blagdon in August and up to three to Sept. 14; up to three also at Barrow Gurney, Sept. 10 - Nov. 2nd.

WOOD SANDPIPER

SA Chew Valley Lake: 39 records from July 14 to Sept. 22, mostly of one or two; but up to five, Aug. 12 - 27th. One at Blagdon reservoir, Aug. 18th.

COMMON SANDPIPER

NA Twenty-eight records of up to three birds, Aust to Chittening Warth, July 6 - October 5th. One on R. Boyd, Wick, Apr. 29 (DRH).

SA Present all months: 105 records (12 in April, 11 May, 1 June, 23 in July, 39 Aug., 29 Sept., 3 in October). Up to six birds, on coast, R. Avon and reservoirs, January - May 18, and one or two, October to December. More on autumn passage, especially at Chew Valley, where maxima were 22 in July and 46 in August and September. One at Saltford sewage farm, Aug. 23 (RMC).

REDSHANK

Breeding confirmed only at coast near Clevedon (SA). Monthly maximum counts in main areas are given in the table. For key to localities see Curlew.

	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Jan.	250	90	650	179	2	187	54	14
Feb.	200			40	10		10	
March	200	20	60	57	21	350	65	
April	50	10	180	67	10	140		1
May	5		28	33		11		
June	160		250	84		6		2
July	500					152		6
Aug.	100							8
Sept.	350			30		200		2
Oct.	200		430			100		
Nov.	150	14		30		170	95	1
Dec.	300	14						
	NA	NA	SA	SA	SA	SA	SA	SA

SPOTTED REDSHANK

SA One - two, Chew Valley Lake in January; two, there, June 22nd. Single birds, Portbury and St George's Wharves and Sand Bay, June 16 - Oct. 16th. Up to six at Blagdon and Chew Valley reservoirs, August and October, and up to twelve in September.

GREENSHANK

NA One in flight, downstream, at Chittening Warth, Aug. 19 (RGT).

SA One or two, coast and reservoirs, April 21 - June 14; noted on coast, July 24 - Sept. 21 (usually single birds). At reservoirs: one or two, July; up to twelve, August to 20th, and Sept. 9 - Oct. 6th, but up to 24, Aug. 21 - Sept. 8th, mostly at Chew Valley (no more than two on any date at Blagdon or Barrow Gurney).

KNOT

NA Records only from Severn Beach, where up to six, Jan. - March; up to three, May 18 - 25th; single birds, Aug. 10 - Oct. 5th.

SA Up to 120, Sand Bay, Jan. - March 13, and 42, December; 100, Clevedon, November. Single birds, Chew Valley Lake, Aug. 9 - 10th.

PURPLE SANDPIPER

NA One or two, Severn Beach, January to April 6th, and December.

SA Single birds at Sand Point, Feb. 26 and Sept. 11 (TB).

LITTLE STINT

NA One in summer plumage, Severn Beach, June 8 (RGT).

SA One or two, Sand Bay, March and Sept. 14 - Dec. 4, with three or four in November (JB, TB). Reservoirs: up to five, Chew Valley in January, one or two in August and up to six, mostly juveniles, in September (to 21st); up to three, Blagdon, Aug. 30 - Sept. 11th.

DUNLIN

Much the most numerous wader of the area. Counts in main areas and at reservoirs summarised in the table; for key see Ringed Plover.

	(c)	(d)	(e)	(f)	(g)	(h)	(k)	(l)
Jan.	5,000	1,750	3,100	2,800	2,500		300	340
Feb.	6,000		2,300	600	800		16	250
March	3,500	700	780	900	2,500			15
April	2,000	350	180		120			1
May	430	140	123	217	15			
June	70	1	2					
July	150	75						21
Aug.	1,500	9				4	15	49
Sept.	120	55	10			4	14	35
Oct.	1,500	300		500		11		
Nov.	5,000	450	1,000	2,500	2,200	86		25
Dec.	5,000	1,200		2,000				30

—NA— ————SA————

CURLEW SANDPIPER

SA Five reports of up to three, Chew Valley Lake, Aug. 1 - 21st and one, Blagdon res. on 25th. Three, St George's Wharf, Oct. 20th.

SANDERLING

NA Reported only from Severn Beach: up to four, April 21 - June 2; single birds, July 31 and Aug. 2; up to six, Sept. 8 - 21st.

SA One or two on coast, January, February, November and December, but up to 14 in January and 42 in November at Sand Bay. Passage records: up to four, May 18 - June 5 and Aug. 17 - Sept. 15, but 29 at Sand Bay on Sept. 14th. At Chew Valley Lake, single birds on May 18 and (mostly immatures) Sept. 3 - 15th

RUFF

SA Six coastal reports, mostly of single birds, January, July and September. AT Chew Valley Lake, 26 reports of up to eleven, Jan. - April 20; and 75 reports, July 19 to end of year, mostly of up to four, but with exceptionally heavy passage, Aug. 21 - Sept. 9, when over 40 were counted on several days and with peak of 71 on Aug. 31. Blagdon reservoir: up to sixteen in January and up to 18, Aug. 11 - Sept. 14th. Barrow Gurney reservoirs: up to five, Oct. 6 - Nov. 2nd.

AVOCET

SA One present at Chew Valley Lake, April 2 (PJC, AML).

GREY PHALAROPE

SA One at Chew Valley Lake, near dam, Sept. 9 (AC, BES). One at St George's Wharf, Sept. 15, in small pool amongst West Dock excavations, watched at very close range - first-winter bird (WGB et al.).

GREAT SKUA

SA One dead on tide-line, Sand Bay, Feb. 19; one at Sand Point, Sept. 26 (RA, TB).

ARCTIC SKUA

NA One flying S. off Aust, Sept. 8 (PJC).

SA Single birds off Sand Point on June 2, 6th and 18th and on Sept. 3 (RA, TB). Two at Chew Valley Lake, Sept. 11 (KEV) and one on 30th (DP).

GREAT BLACK-BACKED GULL

NA Two at Oldbury on Severn, seen on Sept. 9 and Oct. 7 (JDRV). Eighteen on R. Avon, Portway, Bristol, May 4 (TBS).

SA One or two, most months, at Chew Valley Lake, with up to seven in December. Up to four, Barrow Gurney and Blagdon resrs., autumn.

LESSER BLACK-BACKED GULL

SA A pair bred on a roof in Bath, close to 1973 site; others may have bred, as 20 adults were on buildings in city centre, July 7 (RMC). Seven nests located on buildings around Victoria Street, Bristol, May 16 (PJC, RFO). At Chew Valley Lake the largest winter count was 75 on Jan. 2 (KEV), but up to 400 were roosting in early December and 629 on 29th (PJC). A bird of the Scandinavian race was seen at Clevedon, Jan. 12 (JFB).

HERRING GULL

NA A pair with fledged young on building, Cumberland Road, Bristol in June (TBS) same area as in 1973.

SA Over 200 flying around buildings, Victoria Street - Redcliffe area, Bristol on May 16. Most were Herring Gulls, and 22 nests were visible from top of multi-storey building (PJC, RFO). A nest with two eggs, found at Sand Point, was later robbed (RA). Fifteen hundred at roost, Chew Valley Lake, Dec. 30 (PJC).

COMMON GULL

SA Chew Valley Lake: 8,000 to 10,000 at roost, December (PJC, KEV).

GLAUCOUS GULL

SA An adult in field at Kingston Seymour, seen on Feb. 27 (LH) and on March 20 (HRH). Full details supplied by both observers.

ICELAND GULL

SA A large sub-adult in breeding plumage in fields, Kingston Seymour, March 2 and 3rd (TRC, KJH, RAR). Another, probably a second year bird, at Chew Valley Lake on Dec. 29 (PJC, RNC). Full details supplied in both cases.

MEDITERRANEAN GULL

SA An adult at sea wall, Clevedon, Aug. 29 (DE).

LITTLE GULL

NA Eight at Severn Beach, May 5 and two adults, Aust, Aug. 2nd.

SA Frequently reported at Chew Valley Lake from April 6 to June 8 and Aug. 20 to Oct. 5, with one immature on Nov. 28; mainly reports of up to three immature birds, but one adult and two immature birds, mid-April, twenty (18 adults) on May 5, and five, Aug. 24 - 26th. Up to four immatures, Blagdon reservoir, Aug. 23 - Sept. 14th. On coast, occasional records of single birds, Aug. 31 - Nov. 9th.

[An exceptional number of 86 birds occurred at Cheddar reservoir, Somerset, on May 4; unprecedented numbers occurred in spring in S. England and in Ireland.]

BLACK-HEADED GULL

NA Some 1,500 on Durdham Down, Bristol, early on Dec. 22 (PJC).

SA Up to 3,500 hawking flying insects over Chew Valley Lake, Aug. 20; estimated 12,000 coming in to night roost there, Dec. 30; some 1,550 at roost, mouth of R. Avon in October. (PJC)

KITTIWAKE

NA An oiled bird, Chittening, March 3 (NTL), and eighty off Aust on March 16th.

SA Small numbers off Sand Point in April and May, with 32 on May 16, and 48 on the 22nd and 23rd. One immature, Weston Bay, July 6 (BLK) and one in Sand Bay, Sept. 7 (RA).

BLACK TERN

NA Seven to N.E. at Chittening, May 6th.

SA Six at Chew Valley Lake, May 5; this and the above were the on only spring records. The autumn passage was marked at Chew Valley, Aug. 4 - Sept. 23, with a peak of c. 200 on Sept. 11 and 25 - 41 from the 12th - 18th; one bird still present, Oct. 6th. At Barrow Gurney reservoirs, six to eight present, Sept. 3 -28th; and at Blagdon reservoir, up to four between Aug. 30 and Sept. 7th. The only coastal autumn record was of three at Sand Point on Sept. 8th.

WHITE-WINGED BLACK TERN

SA An immature bird was present with some 120 Black Terns at Chew Valley Lake on Sept. 11 (GF, KEV). Full description supplied. The record has been accepted by British Birds Rarities Committee.

This is the seventh individual recorded from the area of the new Avon County: the first and fourth were at Barrow Gurney resrs. in 1949 and 1969, and the others at Chew Valley Lake from 1966. All have occurred between Aug. 13 and Sept. 16th.

COMMON TERN and ARCTIC TERN

Heavy spring passage on coast and at Chew Valley Lake, April 23 to June 8, with a smaller autumn passage from July 9 to October.

NA Some 150 at Severn Beach, April 27; 48, Aust, May 3 and 33 at Chittening on 6th; ten, Avonmouth, June 7th. No autumn records.

SA Forty at Sand Point, April 27, and up to 60 there and Weston Bay, in May. At Chew Valley Lake, peak of 130 on May 3, then 70 on 4th and 60 on 5th, but only small numbers later; autumn peak here was 30 on several dates; one or two Arctic Terns identified on several dates in September (KEV). Up to ten at Blagdon res. and up to three at Barrow Gurney, August and September.

LITTLE TERN

SA Recorded only on autumn passage: up to four at Chew Valley Lake from July 21 - Sept. 19 (eight records). Two, Sand Bay, Aug. 13th.

SANDWICH TERN

NA One at Severn Beach, Sept. 8th.

SA Total of 25 birds, mainly in autumn. Six off Sand Point, May 1st and single birds on June 6 and 11th. All others at Chew Valley Lake: one, April 12; two, June 2 and Aug. 18; one on Aug. 30; eight on Sept. 10 and three on 14th.

RAZORBILL

SA One off Brean Down, May 4th (RA).

GUILLEMOT

SA Two off Steep Holm, May 26 (BLK). Single birds in Sand Bay, June 6 and off Brean Down on 22nd (RA); one, heavily oiled, in Sand Bay on Dec. 29th (TB).

STOCK DOVE

NA A flock of 100, Chittening Warth throughout January (RGT).

SA Flocks of up to 350 at Chew Valley Lake, January and February, but no more than 20 there for rest of year. Only other flock of more than 20 was fifty at Blagdon res. in January. Breeding records from Abbots Leigh, Belmont Hill, Ashton Park and Brockley Combe.

WOODPIGEON

Common throughout area. Flocks of up to 550 reported from Abbots Leigh (SA) in December (TBS).

TURTLE DOVE

NA Reported from Tortworth, Inglestone Common nr. Wickwar, Oakford nr. St Catherine and Tormarton, May 26 to Aug. 11th.

SA Reported from sixteen localities, April 24 to Aug. 20th.

COLLARED DOVE

Common in most parts of area, and spreading into remainder.

NA One at bird table, Abbotside, Cromhall, April 27 - first for this locality (JH).

CUCKOO

Records from four localities in NA and 28 in SA do not reflect relative status. Juvenile fed by Dunnock, Blagdon res., July 12 is only positive proof of breeding.

BARN OWL

NA One was seen at Almondsbury in February. A pair probably bred in the Lawrence Weston area.

SA Two pairs bred at Chew Valley Lake (2 and 3 young). Single birds seen in breeding season at Blagdon, Chew Stoke, Marksbury, Worle and St George's Wharf. Winter records from ten localities.

LITTLE OWL

Records from 32 localities, covering all months, but few from north Avon. Breeding reported only from Whitchurch and from Norton Malreward, SA; but this undoubtedly understates the true position.

TAWNY OWL

Widely recorded throughout the year, from NA and SA. A pair reared two young in a nest box at Chew Valley Lake.

SHORT-EARED OWL

NA Present at Chittening from January to April 21; usually one or two birds, but four on Jan. 5 and five on the 19th. Single birds present again from Oct. 16 onwards. One at Aust, May 3 (PJC).

SWIFT

SA First arrivals noted were at Chew Valley Lake on April 23rd. The largest count there was some 2,000 in July; many also gathered at Blagdon reservoir in July, with 10,000 estimated on the 12th (KEV).

KINGFISHER

NA Reported from Cromhall, Bradley Brook nr. Winterbourne, R. Boyd nr. Wick, and in Bristol from R. Trym (Sea Mills) and R. Frome (Eastville and Vassalls Parks and Wickham Glen).

SA Reported from 16 localities including coast, reservoirs, moors and Rivers Chew and Avon. Breeding confirmed at Chew Valley Lake and on Winford Stream (Littleton, nr. Winford), and R. Chew, Woolard.

HOOPOE

NA One present near Thornbury, end of April (*per* CC).

GREEN WOODPECKER

NA Reported from Oldbury on Severn, Cromhall, Tortworth, Milbury Heath, Thornbury and Wick, throughout the year; but undoubtedly much more widespread than this list suggests.

SA Reports, covering all months, from 21 localities. Nest with young in Ash tree, St George's Wharf, June.

GREAT SPOTTED WOODPECKER

NA Reports from Tortworth, Cromhall, Alveston, Almondsbury, Wick (nest holes made in cedar tree), and in Bristol from the Frome Valley, Durdham Down and Bridge Valley Road.

SA Reports from 22 localities, including several breeding records.

LESSER SPOTTED WOODPECKER

NA Records from Sheperdine, Wick, Upton Cheyney and, in Bristol, Frome Valley (Vassalls and Snuff Mills Parks).

SA Noted at Abbots Leigh, Leigh Woods, Ashton Park, Barrow Gurney, Blagdon, Chew Valley Lake (at least two pairs) and North Stoke.

WOODLARK

SA One was seen at Sand Bay, May 5 (TB).

SAND MARTIN

The only reports of breeding colonies were from the bank of the Feeder Canal, Bristol and from wall drains at Batheaston (SA).

RAVEN

SA One and sometimes two were seen in the Weston-s-Mare area throughout the year, with six on Oct. 27, but there was no proof of breeding (JB, PJC, JAMcG, DW).

WILLOW TIT

Reports of one and sometimes two from Inglestone Common, near Wickwar (NA) and from Blagdon reservoir (SA)(JB, PJC).

DIPPER

Reported throughout the year from R. Boyd at Wick (NA) and from Littleton near Winford (where breeding was proved), North Wick near Dundry, Midford - Combe Hay, and Hinton Charterhouse (RMC, DRH, JVT).

BEARDED TIT

SA Two reported from Chew Valley Lake, Jan. 10 - March 3, and up to four there, October 19 - December 31st (AHD, SBE, BLK).

RING OUZEL

NA One found dead under window, Bristol Grammar School, May 4 (DJ).

SA Up to three noted on spring passage, March 27 - May 5, at Sand Point and Weston-s-Mare. One autumn record - one seen at Sand Point on Sept. 10th.

WHEATEAR

Noted on passage from March 5 to June 4 and from July 14 to Oct. 12, at widespread localities in NA and SA, including, in Bristol, Clifton Down, Hartcliffe and the old airport, Whitchurch.

STONECHAT

NA Reports (28) covering all months, from Aust Warth, Severn Beach, Chittening Warth, Filton and in Bristol from St Philips Marsh, Purdown, Avonmouth refuse works, Shirehampton and Lawrence Weston.

SA Fifty reports, covering all months, from Flowers Hill (with fledgling), Whitchurch old airport (breeding proved), and Stockwood, Bristol; and from Queen Charlton, Barrow Gurney resrs., St George's Wharf, Gordano Valley, Tickenham, Nailsea and Kenn Moors, Clevedon Pill, Yeo estuary, Sand Point, Uphill, Compton Hill, Compton Martin, Blagdon reservoir, Chew Valley Lake and Congresbury.

WHINCHAT

Reports from March 19 to Oct. 12 from, in NA, Charfield, Aust, Severn Beach, Filton and Lawrence Weston, Bristol; and, in SA, Hartcliffe and Stockwood (Bristol), Bower Ashton, Long Ashton, Nailsea Moor*, Portbury Wharf, Clevedon, Sand Bay, Chew Valley Lake, Pensford and Lansdown. *Breeding proved.

REDSTART

Reports of single birds, April 6 - June 9 and Sept. 18 - Nov. 3, from Filton (NA), St George's and Portbury Wharves, Nailsea, Congresbury, Burrington and Chew Valley Lake. No breeding records.

BLACK REDSTART

Reports, March 8 - April 17 and Aug. 8 - December, from, in NA, New Passage, Severn Beach, Hallen, Chittening, Filton and Upper Eastville (Bristol); and, in SA, Clevedon and Middle Hope.

NIGHTINGALE

Reports of up to eight singing males from, in NA, Inglestone Common, Elberton and Conham Vale (Bristol); and, in SA, Abbots Leigh, Midford and Friary Wood and Cleeves Wood (Bath), April 28 - June 1st.

GRASSHOPPER WARBLER

Singing males reported, May 3 - Aug. 24, from, in NA, Inglestone Common, Aust Warth, Severn Beach and Holes Mouth (Chittening); and, in SA, Whitchurch old airport (Bristol), Clevedon, Sand Point and Chew Valley Lake.

WOOD WARBLER

Singing males reported, April 26 - May 27, from, in NA, Oakford near St Catherine, Snuff Mills (Bristol), and Chittening; and, in SA, Leigh Woods, Abbots Leigh, Ashton Park, Brockley Combe, Barrow resrs., Chew Valley Lake, Midford, South Stoke and Rainbow Wood (Bath).

FIRECREST

One and sometimes two reported from St Philips Marsh, Bristol (NA), Oct. 15; Abbots Leigh, Dec. 21, and Chew Valley Lake, Nov. 24 to end of year (CVRS, TBS, GW).

PIED FLYCATCHER

SA A single bird was noted at Chew Valley Lake on Sept. 8 (CVRS).

RICHARD'S PIPIT

SA One was watched by KLF on coast between the Kenn Estuary and Clevedon, Dec. 15th. Detailed description received.

TREE PIPIT

Reports of up to ten, April 9 - Sept. 15 from Filton (NA) and Hartcliffe (Bristol), Portbury Wharf, Sand Bay and Chew Valley Lake.

ROCK PIPIT

Coastal records from Oldbury on Severn, Severn Beach and Cumberland Basin (Bristol) in NA, and from Clevedon and Sand Point (nest with 4 eggs) in SA, which also supplied the only inland record, from Barrow Gurney resrs., where three were noted, Oct. 19 and 20th.

WATER PIPIT

SA Up to twelve birds reported, Jan. 2 - April 18 and Oct. 26 - Dec. 31, from Barrow Gurney resrs. and Chew Valley Lake.

PIED WAGTAIL

Common and widespread resident. Reports of communal roosts include 50, Broadmead, Bristol, Jan. 10 and 200, Cumberland Basin, Bristol in March, both in NA; and 250, Hartcliffe, Bristol and 250, Chew Valley Lake, both in August, also 120 on playing fields, Failand on Aug. 18th.

WHITE WAGTAIL

SA Reports of up to fifteen birds, April 15 - 30th and Aug. 31 - Sept. 8, from St George's Wharf, Clevedon, and Barrow Gurney resrs. and Chew Valley Lake.

GREAT GREY SHRIKE

SA One was seen at Sandford on Jan. 19th (JB).

HAWFINCH

Up to six birds noted at Clifton Down, Bristol (NA) and Leigh Woods, Abbots Leigh, Chew Valley Lake and Tucking Mill, Bath (SA).

SISKIN

NA Forty-five reports from widespread localities including, in Bristol, Eastville, Vassalls and Snuff Mills Parks and Henleaze (NA), and Southville (SA). Reports were of up to 45 birds and covered the periods January to April 15 and Sept. 18 to December 31st.

TWITE

SA Six were observed at Sand Bay on Oct. 22 (TB).

REDPOLL

NA Single birds noted at Wickham Glen, Bristol in April and late September, and up to five at Filton, September to November.

SA Up to 50 birds reported from widespread localities, from January to May 6 and July 27 to December.

BRAMBLING

Many reports, January - April 6, and Oct. 9 - December, of up to 300 birds in widespread localities including, in NA, Severn Beach, Chittening Warth, Wick and Charmy Down. A large flock, estimated as 600 birds, was seen at Chittening Warth on Jan. 5 (RGT).

CORN BUNTING

NA Breeding-season reports from the usual area, Marshfield to Tormarton, with 21 singing males noted on June 21st.

SA Up to four birds reported, from April to Aug. 1st, from Portbury Wharf, Dundry and Lansdown.

CIRL BUNTING

SA Pairs noted at Bleadon Hill on Feb. 23 and at Worlebury Golf Course on April 15th (TRC, SBE).

SNOW BUNTING

SA Up to five birds were noted at Sand Bay and the Axe estuary, Jan. 3 and Oct. 12 - Dec. 11 (RA, TB, AM).

ADDENDUM

The following record was received too late for inclusion in its appropriate place in the Systematic List, after Little Ringed Plover.

KENTISH PLOVER

SA One, probably a female, was seen at Chew Valley Lake on Aug. 19 by RSH.

OTHER SPECIES COMMON OR OCCURRING REGULARLY

Those marked * are mentioned in the Foreword.

Residents: Pheasant, Skylark, Carrion Crow, Rook, Jackdaw, Magpie, Jay; Great, Blue, Coal, Marsh and Long-tailed Tits; Nuthatch, Treecreeper, Wren*, Mistle Thrush, Song Thrush, Blackird, Robin, Goldcrest*, Dunnock, Meadow Pipit, Grey Wagtail, Starling, Greenfinch, Goldfinch, Linnet, Bullfinch, Chaffinch, Yellowhammer, Reed Bunting, House Sparrow, Tree Sparrow.

Summer or winter visitors: Swallow, House Martin, Fieldfare*, Redwing*, Reed* and Sedge* Warblers, Blackcap, Garden Warbler*, Whitethroat*, Lesser Whitethroat, Willow Warbler, Chiffchaff, Yellow Wagtail.

BOOK REVIEW

Limestones and caves of the Mendip Hills.
Compiled and edited by D.I. Smith, assisted by D.P. Drew.

David & Charles: The Limestones and caves of Britain.
(Series editor: T.D. Ford). £7.50. 1975.

This book is the work of four authors. Although it is intended as a coherent whole, its eight chapters fall into two distinct categories.

The first half of the book is a general account of the geology and hydrology of Mendip, followed by a detailed discussion of the various theories of cave- and gorge-formation. It is excellently written in largely non-technical language, and could well have formed a book in its own right; it would also serve as an introduction to a much-needed "natural history of Mendip" (hint for someone!). This is followed by descriptions of individual caves: whether you enjoy this kind of thing or not is a matter of taste; I confess that I do not, but it is all very competent, and tribute to the labours of a large band of devotees who have taken their hobby seriously, and produced work of importance and value.

In a chapter headed "The Biology of Mendip Caves" are listed all the species of animals which have ever been recorded in the Mendip caves. This is work of erudition and scholarship. The author has attempted to liven it up by dividing the animals into "troglobites" (which are obligatory cave-dwellers), "troglophiles" (which are usually associated with caves, but can survive outside them), and "trogloxenes" (which get into caves by accident). Many of the animals are in the latter category. The sections on the relatively small numbers of "troglobites" are best, and I should have preferred to have seen these expanded at the expense of the rest. Bats are scarcely mentioned, although the bat-louse is listed - is this reticence a conservation measure?

Finally, there is a chapter "The cave archaeology and palaeontology of Mendip." This too is a comprehensive piece of scholarship, by Professor Tratman, the doyen of Mendip speleologists; but it is really for reference, and the reviewer found it, like the last chapter, a little dull.

So this is really two books in one, and I think that the two parts will appeal to different groups of people. But both of them are very good: if you are seriously interested in Mendip, you cannot afford to neglect them.

R.A.A.

LEPIDOPTERA NOTES

BRISTOL DISTRICT, 1974

BUTTERFLIES

By A.N. GROSE

In spite of the generally cool and sunless spring and summer, the numbers of early summer species, especially those feeding on grasses, were mainly maintained, but migrants were sadly depleted by the wet autumn and only one Painted Lady was recorded. The High Brown Fritillary, not recorded in 1973, was seen in Great Breach Wood near Street, and the Marsh Fritillary at Charterhouse was seen in greater numbers. The Purple Hairstreak was scarce, and the White-Lettered Hairstreak has disappeared in one locality due to Dutch Elm Disease.

Records were received from:- R.Angles (RA), J.F. Burton (JFB), A.N.Grose (ANG), B.Harper (BH), B.L.Kington (BLK), H.R.H.Lance (HRL), R.W.Rowe (RWR), M.A. Silcocks (MAS), T.B.Silcocks (TBS), D.R.Hamblett (DRH). G. and S. refer to the vice counties West Gloucestershire and North Somerset.

Speckled Wood
Widespread and common in July. Kingsweston Down, several May 7 (ANG); Eastville, one April 9 (BLK); Hay Wood, 6 on May 14 (ANG); Burrington Combe, 6 on June 6 (HRL); Wraxall, numerous June 22 (JFB).

Wall Brown
Small numbers, Kingsweston Down on 1 August, 15 (TBS); Brean Down, 8 on June 1 (RA); Kingston Seymour, 2 on May 26 (HRL); Aggs Hill, many June 4 (ANG).

Marbled White
Fairly common in the usual localities. Filton, 100 on July 8 (RA); Goblin Combe, 20 on July 6 (RA); Crook Peak, numerous July 23 (JFB).

Grayling
Usual numbers, local.
G. Bream Mine, Forest of Dean, 6 on July 23 (ANG).
S. Sand Point, 4 on July 17 (MAS); Brean Down, 3 on July 13 (RA); Crook Peak, many July 23 (JFB).

Meadow Brown
Widespread and numerous. Barnsley Common, many on June 20 (ANG); Blakeney common July 18 (HRL); Brean Down, abundant June 28 (RA); Walton Down, common August 6 (JFB).

Hedge Brown
Common and widespread. Kingsweston Down, abundant August 21 (RA); Sand Point and Portbury, abundant July 28, August 18 (TBS & RA); Great Breach Wood, abundant August 6 (JFB); Wick, fairly common July and August (DRH).

Small Heath
Widespread and fairly common. Nailsworth many May 18 (ANG); Filton, 16 on May 31 (RA); Charterhouse, June 4; Sand Point June 16, common (TBS).

Ringlet
Fairly common in woodlands. Blackpool Bridge, Forest of Dean, common

July 7 (ANG); Goblin Combe, 8 on July 6 (RA); Leigh Woods, abundant July 20 (BH); Crook Peak, Mendip abundant July 23 (JFB); Wick, a few July and August.

Small Pearl-Bordered Fritillary
G. Cannop Ponds, Forest of Dean, 8 on June 10 (ANG); Blackpool Bridge, 3 on June 21 (ANG).
S. Burrington Combe, 2 June 6 (HRL); Goblin Combe, 15 on 14 June (RA); Brockley Combe, 12 on July 6 (BH).

Pearl-Bordered Fritillary
G. Dymock Wood, 10, Hay Wood, 5 on 30 May (ANG).
S. Goblin Combe, on on 19 May (ANG).

Dark Green Fritillary
G. No records
S. Brean Down, 15 on June 29; Goblin Combe, 6 on July 6 (RA); Brockley Combe, common July 14 (BH); Crook Peak, numerous on July 23 (JFB).

Silver Washed Fritillary
G. Dymock Wood, several July 18; Blackpool Bridge, several July 23 (ANG).
S. Great Breach Wood, several August 6 'JFB); Brockley Combe, 5 on July 6 (BH).

High Brown Fritillary
G. No records
S. Great Breach Woods, several August 6 (JFB).

Marsh Fritillary
G. No records
S. Charterhouse, common June 4 (MAS); 5 on June 10 (HRL).

Red Admiral
Widespread but few in number. Blakeney, 1 July 7; Filton 1 September 26 (RA); Portbury 1 July 29; Abbots Leigh 1 September 23 (TBS).

Painted Lady
Scarce, only one record: Clevedon, September 14 (JFB).

Small Tortoiseshell
Few in number but widespread. Weston-s-Mare, 1 March 3 (RA); Filton 6 on July 17 (RA); Kenn Moor, 2 on April 30, 2 on September 6 (RRL); Blagdon Lake, 1 May 9 (JFB).

Peacock
Seen throughout the area in small numbers. Filton, 1 March 7, 6 on April 14 (RA); Sand Point, 8 on August 18 (RA); Portbury, 3 on August 3; Abbots Leigh, 1 on March 31 (TBS); Great Breach Woods, several on August 6 (JFB).

Comma
Widespread but fewer than usual. Blakeney, 1 on April 8 (ANG); Filton, 1 on April 9, 1 on October 10 (RA); Sea Mills, 1 on October 17 (TBS); Goblin Combe, 4 on April 6 (BH); Wick, a few in early spring and autumn.

White Admiral
Numbers maintained. Dymock and Hay Woods, 15 on July 18 (ANG); Blackpool

Bridge, Forest of Dean, 1 on July 23 (ANG).

Small Blue
G. Local, in fair numbers. Cranham, 15 on June 17; Barnsley, common on June 20; Tetbury, one on June 11 (ANG); Filton, 4 on June 20, 6 on August 19 (RA).
S. Uphill, 9 on May 27 (BH).

Brown Argus
Local, in fair numbers.
G. Aggs Hill, common June 4 (ANG).
S. Goblin Combe, 4 on June 14, 6 on July 6 (RA); Brockley Combe, 16 on June (BH); Walton Down, 15 on June 4 (HRL).

Common Blue
Widespread, numbers down. Whitecroft, several on June 10 (ANG); Cadbury Camp, 1 on June 16 (RWR); Sand Point, 20 on June 4 and 27 on August 4 (RA); Portbury, 10 on June 15 (TBS); Burrington Combe, 15 on June 6 (HRL).

Holly Blue
Numbers reduced. Weston Wood, 2 on April 7; Goblin Combe, 1 on June 14 (RA); Abbots Leigh, 1 on May 14; Kingsweston Down, 1 on August 5 (MAS); Dymock Wood, 1 on July 18 (ANG); Wick, 1 on April 1, 2 on May 6, 1 on August 9 (DRH).

Chalkhill Blue
G. No records
S. Brean Down, abundant August 17; Sand Point, 1 on August 18 (RA).

Small Copper
Tideham Chase, 2 on August 27 (ANG); Filton, 10 on July 17, 4 on August 9 (RA); Brean Down, 5 on July 20 (RA); Clevedon 1 on September 14 (JFB); Portbury 1 on August 18 (TBS); Wick, 1 on August 9 (DRH).

Green Hairstreak
G. Filton, 2 on May 15, 2 on May 29 (RA); Stinchcombe Hill 3 or 4, May 11.
S. Goblin Combe, several May 19 (ANG); Shute Shelve, 3 on May 13 (HRL); Brockley Combe, 1 on June 1 (BH).

Purple Hairstreak
G. Blackpool Bridge, Forest of Dean, 3 on August 5 (ANG).
S. Conglesbury Woods, 1 on July 29 (BH); Walton Down, 1 on August 6 (JFB).

White Lettered Hairstreak
G. Tintern Railway, few on July 7; Kingsweston Down, 3 on July 23 (ANG).
S. Leigh Woods, 1 on July 7 (BH).

Wood White
G. Number increased. Symonds Yat, several on June 13 (ANG).
S. No records.

Large White
Widespread, fairly common. Filton, 1 on May 15 (RA); Kingsweston Down, 6 on June 11 (HRL); Goblin Combe, 8 on August 3 (RA).

Small White
Widespread, fairly common. Kingsweston Down, 6 on June 11 (HRL); Sand

Point, 1 on April 16 (TBS); Brean Down, 50 on June 19 (HRL).

Green Veined White
Widespread, fairly common. Filton, 1 on April 4 (RA); Blakeney, many May 23 (ANG); Wraxall, numerous June 22 (JFB);

Orange Tip
Numbers slightly down. Blakeney, 1 on April 16 (ANG); Filton, 3 on May 15 (RA); Congresbury, 1 on May 15 (RWR); Burrington Combe, 5 on June 6 (HRL); Wick, a few on May 6.

Brimstone
Widespread, below normal in the autumn. Filton, 4 on April 9 (RA); Snuff Mills, Wickham Glen, April 5 (BLK); Weston Wood, 4 on April 7 (RA); Ebor Rocks, 12 on 4 April (HRL).

Dingy Skipper
Aggs Hill, Cheltenham, common on June 4 (ANG); Goblin Combe, several on May 19 (ANG); Ashcott, 1 on May 29 (BLK); Charterhouse, several on June 4 (MAS); Stinchcombe Mill, common on May 11 (DRH).

Small Skipper
Filton, 10 on July 17 (RA); Blakeney, 5 on July 18 (HRL); Portbury, 1 on July 21 (TBS); Brean Down, 5 on July 20 (RA); Great Breach Wood, several on August 6 (JFB); Stinchcombe Hill, several on May 11 (DRH).

Grizzled Skipper
Whitecroft Mine, 2 on June 10 (ANG); Tetbury, few on June 11; Goblin Combe, several on May 19 (ANG); 3 on July 6 (RA); Brockley Combe, 1 on May 19 (BH).

Large Skipper
Barnsley Common, many June 20 (ANG); Filton, 10 on June 18 (RA); Goblin Combe, 10 on July 6 (RA); Uphill, 3 on June 18 (RHL); Great Breach Wood, several on August 6 (JFB).

MOTHS

By K.H. POOLE

The following list has been compiled from records contributed by C.S.H. Blathwayt (CSHB), J.F. Burton (JFB), P.H. Heath (PMH) and R.W. Rowe (RWR). Unless marked *, all were noted at light and were single specimens unless shown otherwise.

Herse convovuli L. Convolvulus Hawkmoth, Wick, one found dead, late Oct.* (D.R. Hamblett).

Sphinx ligustri L. (Privet Hawkmoth), Bristol, June 16 (PMH).

Macroglossum stellatarum L. (Humming Bird Hawkmoth), Milton, Weston-s-Mare, Aug. 24 * (KHP).

Hemarus tityus L. (Narrow-bordered Beehawk), * Ashcott, a few, May 27 (CSHB).

Stauropus fagi L. (Lobster Moth), Leigh Woods, Bristol (PMH).

Chaonia ruficornis Hubn. (Lunar Marbled Brown), Bristol, May 15 (PMH)

Pterostoma palpina Cl. (Pale Prominent), Bristol, June 13, 18 (PMH).

Tethea ocularis Hubn. (Figure of Eighty), Bristol, June 12, 16 (PMH).

Earias chlorana L. (Cream-Bordered Green Pea), Shapwick, June 14 (CSHB).

Colocasia coryl L. (Nut-tree Tussock), Leigh Woods, Bristol (PMH).

Agrotis lunigera Steph. (Crescent Dart), Weston-s-Mare, July 24 (CSHB).

Triphaea pronuba L. (Large Yellow Underwing), Bristol, April 23, an early date (PMH).

Episema caeruleocephala L. (Figure of Eight), Clevedon, May 26, 2 largae (JFB).

Phalaena typica L. (Gothic), Congresbury, July 7 * (RWR).

Apamea sublustris Esp. (Reddish Light Arches), Weston-s-Mare, June 25 (CSHB).

Procus versicolor Borkh. (Rufous Minor), Bristol, June 18 (PMH).

Nonagria dissoluta Treits. (Brown-veined Wainscot), Berrow, a few, Aug. 2 * (CSHB).

Leucania straminea Treits. (Southern Wainscot), Berrow, common, Aug. 2 * (CSHB).

Cucullia chamomillae Schiff. (Chamomile Shark), Bristol, May 17 (PMH).

Scoliopteryx libatrix L. (The Herald), Bristol, May 17, June 17 (PMH).

Abrostola triplasia L. (Dark Spectacle), Bristol, (PMH).

Cosymbia trilinearia Borkh. (Clay Triple-lines), Leigh Woods, Bristol, June 14 (PMH).

Calocalpe cervinalis Scop. (Scarce Tissue), Weston-s-Mare, May 25 (CSHB).

Thera variata Schiff (Grey Pine Carpet), Leigh Woods, Bristol, and Bristol, May 16, June 11 (PMH).

Colostygia olivata Schifff (Beech Green Carpet), Leigh Woods, Bristol, June 14, Bristol, June 12, 14 (PMH).

Mesolenca albicillata L. (Beautiful Carpet), Leigh Woods, Bristol (PMH).

Asthena albulata Hufn. (Small White Wave), Leigh Woods, Bristol, June 14 (PMH).

Discoloxia blomeri Curt. (Blomer's Rivulet), Leigh Woods, Bristol, June 14, 20, numerous (PMH).

Eupithecia intricata Lett. subsp. arceuthata Freyer (Freyer's Pug), Milton, Weston-s-Mare, May 30 (KHP).

Plagodis dolabraria L. (Scorched Wing), Bristol, May 27, June 7, 11, 15, numerous (PMH).

Selenia tetralunaria Hufn. (Purple Thorn), Bristol, May 7 (PMH).

Cepphis advenaria Hubn. (Little Thorn), Leigh Woods, Bristol, June 14 (PMH).

Hama wauaria L. (V-moth), Congresbury, July 11 * (RWR).

Chiasmia clathrata L. (Latticed Heath), Clevedon, June 12, fairly numerous (JFB), Bristol (PMH).

Lycia hirtaria Cl. (Brindled Beauty), Bristol (PMH).

Ectropis extersaria Hb. (Brindled White Spot), Leigh Woods, Bristol (PMH).

Nymphula stagnata Don. (China Mark), Congresbury, June 25 * (RWR).

Zeuzera pyrina L. (leopard Moth), Shapwick, July 19 (KHP).

Nonagria dissoluta and *Eupithecia arceuthata* would appear to be first records for the area.

Records for Bristol (JFB) are from the Stoke Park Road area.

The list received from Congresbury (RWR), which has not figured in this report in recent years, also includes *Philudoria potatoria* L. (The Drinker), *Spilosoma lutea* Hufn. (Buff Ermine), *Arctia caja* L. (Garden Tiger), *Agrotis exclamationis* L. (Heart and Dart), *Triphaena pronuba* L. (Large Yellow Underwing), *Apamea lithoxylaea* Schiff. (Light Arches), *Plusia gamma* L. (Silver-Y), *Hypena proboscidalis* L. (The Snout), *Sterrha aversata* L. (Riband Wave) *Xanthorhoe fluctuata* L. (Garden Carpet), *Euphyia bilineata* L. (Yellow Shell), *Lomaspilis marginata* L. (Clouded Border), *Campaea margaritata* L. (Light Emerald), *Ourapteryx sambucaria* L. (Swallowtailed Moth), *Erharmonia pomonella* L. (Codling Moth), *Crambus tristellus* Schiff. (Grass Moth), *Mesographe forficalis* L. (Garden Pebble), *Eurrhypara hortulata* L. (Small Magpie), *Alucita pentadactyla* L. (White Plume-moth), *Zygaena trifolii* Esp. (Five-spot Burnet), *Hepialus lupulina* L. (Common Swift).

THE HARVEST MOUSE, *Micromys minutus*, IN THE BRISTOL AREA

BY STEPHEN HARRIS

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and

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INTRODUCTION

The Harvest Mouse, *Micromys minutus* has for long been considered to be rare in the Bristol area. Since the inception of the Bristol Naturalists' Society Mammal Section very few records for this species have been included in the annual mammal reports. The few records available all referred to Somerset and, except for the one nest found near Wrington, consisted entirely of remains found in bird pellets (Silcocks 1969) and so the actual sites of the colonies were not known.

In the autumn of 1972 the first serious attempt to look for this species was made, in Somerset, by the authors and other members of the Mammal Section (Symes 1973). During a further field meeting, held in Somerset on October 21st 1973, a number of people were shown how to locate colonies of Harvest Mice, and since that time a large number of records has been forthcoming. Two field meetings held in Gloucestershire on October 27th were also used to initiate new Harvest Mouse recorders.

This paper presents the preliminary results of a survey into the distribution and status of this species in the Bristol area. Old records for the four counties (i.e. Somerset, Gloucestershire, Monmouthshire and Wiltshire) that lie, in part, within the recording area of the BNS Mammal Section are reviewed. Recent records for all of Wiltshire have been collected independently by Browne & Gillam (1974), and so those current records have not been included.

HISTORICAL SURVEY

A brief synopsis of the pre-1960 records is presented here to illustrate the paucity of early information about the Harvest Mouse in the Bristol area. Few of the early naturalists managed to find Harvest Mice in habitats other than cereal ricks and, as a result, few documented records exist, and even some of these "records" are obviously erroneous. In view of this, little reliance can be placed on comments made by most early naturalists relating to the status of the species, although for historical interest their comments are included in the following account.

Somerset (vice-counties 5 and 6)

Both vice-counties are included since most of the early records refer to the county as a whole and cannot be assigned to a specific area.

Baker (1849-50) included *Mus messorius* in his list of the Somersetshire fauna, but no details of the records were given. Farbrother (1859) listed the Harvest Mouse as one of the "wild quadrupeds" in the neighbourhood of Shepton Mallet, and Terry (1864) also listed this species as occurring within a radius of six miles from Bath (this area also includes parts of Wiltshire and Gloucestershire). In 1870 a specimen was collected in Somerset (no other details recorded) by Hügel (the skin is preserved in the British Museum (Natural History) - catalogue number BM 79.9.25.62). This specimen was referred to by Miller (1912). Compton (1882) noted the Harvest Mouse as a rare animal occasionally found in the neighbourhood of Winscombe.

Charbonnier & Morgan (1898) described the Harvest Mouse as "decidedly rare in the Bristol district", and Charbonnier (1906) described it as "local and decidedly scarce in the more northern parts" of Somerset "but fairly common a few miles from Yeovil". These comments were quoted by Barrett-Hamilton & Hinton (1910-21), but three other contemporary accounts of the national distribution of the Harvest Mouse (Harting 1895, Millais 1905, Adams 1913) all failed to include Somerset in the known range of this species.

Knight (1902), in his account of the coastal area of Mendip, described the Harvest Mouse as rare and noted that the only specimens seen by the author had been obtained from ricks during the winter at threshing-time. Tucker (1926), in his notes on Somerset mammals, made no mention of this species, but little significance can be placed on this since many other species were also omitted. Tetley (1940) reviewed the status of the land mammals of the Bristol district, and for the Harvest Mouse he stated that "it has for long been considered rare and local in this district". He added that it was said to occur near Wells, that being the only definite record in his possession.

Wiltshire (vice-counties 7 and 8)

Although Gilbert White (1789) is accredited with the discovery of this species in the British Isles (in Hampshire in 1767), Montagu (1803) claimed to have seen this animal at an earlier date "in the more champaign parts of Wiltshire", where he described it as common.

Little other early information seems to have been recorded for Wiltshire. Harting (1895), Millais (1905) and Barrett-Hamilton & Hinton (1910-21) all record this species as occurring in Wiltshire on the authority of Montagu, whose records were made well over a century earlier. Millais also recorded (p.179) that "The only nest I ever found was at Marlborough in Wiltshire. It was placed in a thorn bush, and interwoven with honeysuckle which grew up the bush". This description and habitat, however, sound much more applicable to the Dormouse *Muscardinus avellanarius* and so this record is viewed with scepticism. Adams (1913) included Wiltshire on his distribution map.

Gloucestershire (vice-counties 33 and 34)

The first record was that of Montagu (1803), who recorded the Harvest Mouse as occurring in those parts of Gloucestershire adjacent to Wiltshire. Knapp (1829), writing about the Thornbury area, recorded the Harvest Mouse as common in some seasons but varying much in the numbers found. His account in the second (1829) and subsequent editions of his book was illustrated with a woodcut showing the mouse and its nest, which he described as "being generally suspended on some growing vegetable, a thistle, a bean-stalk, or some adjoining stems of wheat". Knapp also made some valuable observations on the over-wintering behaviour of the animals.

Roberts (1831), describing a cereal field a short distance from the village of Sheepscombe, noted "Harvest-mice were also frequent guests". However, the description and comments that followed were so inaccurate that this record cannot be accepted. Bell (1837) noted the Harvest Mouse as having been found in Gloucestershire, but no information was included as to on whose authority the record was made.

Witchell & Strugnell (1892) presented additional information with records for "near Wotton-under-Edge" and "from Stonehouse". These records were undated, however, which is unfortunate since they appear to be the last positive records for Gloucestershire before those presented in this paper.

Harting (1895) and Millais (1905) both recorded the Harvest Mouse from Gloucestershire on the authorities of Knapp and of Witchell, and Barrett-Hamilton & Hinton (1910-21) quoted the comments of Harting. Adams (1913) included Gloucestershire on his distribution map for this species.

Monmouthshire (vice-county 35)

There are no records for this county that predate those presented in this survey.

CURRENT RECORDS

This is taken to include all records from 1960 to the end of 1974, so keeping in line with the National Mammal Survey. The survey area chosen was the vice-counties of North Somerset, East Gloucestershire, West Gloucestershire and Monmouthshire. All records (including those known from localities adjacent to the study area) are shown on Map 1, each symbol denoting at least one record received for that one kilometre square. Details of the sites may be obtained from R.G. Symes, who is Mammal Recorder for the Bristol Naturalists' Society.

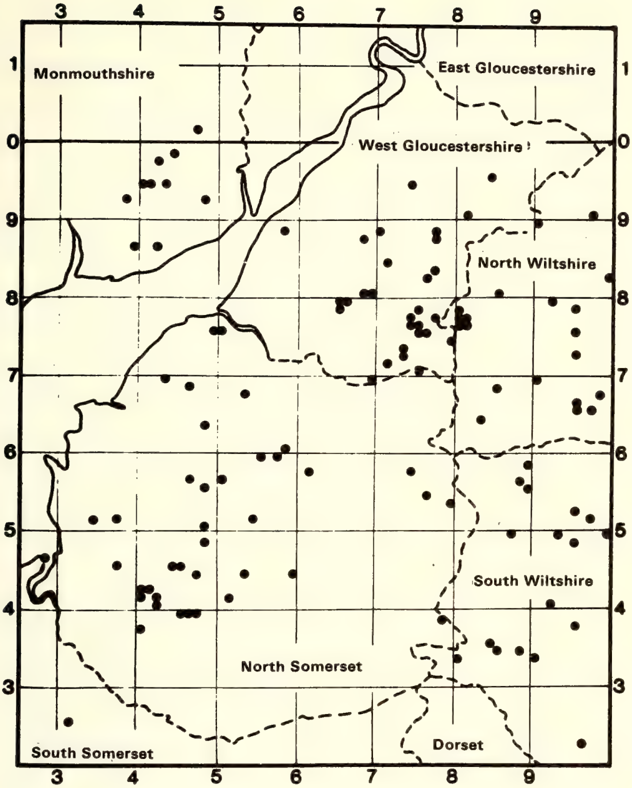
North Somerset (vice-county 6)

As can be seen from Map 1, the largest number of records is from North Somerset, where most of the preliminary survey effort has been concentrated. In all, records have been received from 39 one-kilometre squares.

In certain areas the species is common, particularly on the peat moors where suitable habitat abounds. Storer (1973), in his account of the Somerset peat levels, noted that Harvest Mouse remains had been recorded from bird pellets but that they were few in number. Although few specimens are recovered from pellets, Harvest Mice are common and this apparent anomaly is presumably due to selective predation on other species of small mammal, either because of their larger size or, more probably, due to their being more easily caught. Harvest Mice live in areas of dense cover which renders them comparatively immune to aerial predation.

In other areas of suitable habitat in Somerset, Harvest Mice have so far either not been recorded or were found to be rare. On the coastal plain there are extensive areas of very similar vegetation to that seen on the peat levels, yet an intensive search has so far yielded few records. Knight (1902) also found that the Harvest Mouse was rare on the sea-board of Mendip. Parts of North Somerset have been converted to pasture land and here very little suitable habitat exists. This accounts for the scarcity of records from the eastern parts of North Somerset, although some effort has been devoted to looking for Harvest Mice in this area.

Perhaps the most interesting records for the area are those from


3
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3
Monmouthshire
East Gloucestershire
West Gloucestershire
North Wiltshire
South Wiltshire
North Somerset
Dorset
South Somerset

Map 1. Distribution of the Harvest Mouse in North Somerset (v.c.6), West Gloucestershire (v.c.34) and Monmouthshire (v.c.35). The broken lines denote Watsonian vice-county boundaries and not administrative county boundaries.

Mendip, where records have been made on the southern scarp and from Mendip plateau up to altitudes of 850 feet. These are amonst the highest colonies known at present in the British Isles. Kell (1859) recorded one colony from Weardale at an altitude of 800 feet, and some records from Devon and Monmouthshire are slightly higher.

West Gloucestershire (vice-county 34)

Since the undated records of Witchell & Strugnell (1892) there had been no confirmed Harvest Mouse records for Gloucestershire. In 1972 K. Lockyer reported to one of us (R.G.S.) that he had seen Harvest Mouse nests "25 years ago" at Beese's Farm, Broomhill, near the River Avon ferry crossing. Symes (1970) included a possible record of a nest in rushes at Wetmoor but this record is now believed to have been made in error. Corbet (1971) included a record for the square SU09 (which covers parts of v.c. 7 and v.c. 33) on the Mammal Society provisional distribution map for the Harvest Mouse, but this record cannot be traced and so it is discounted. Some details records for East Gloucestershire (v.c. 33) are given in Harris (1974) and Holland (1975).

The records here presented are, therefore, the first known Gloucestershire records this century, and they cover 28 one-kilometre squares, all made since September 1973 (map 1). The finding of a first site near Cirencester, at Siddington, and the first sites in West Gloucestershire, was reported by Holland (1973). Since then a number of records have been made, most of them from hedgerows bordering arable fields or from roadside verges (including two records from the embankments of the M4 motorway).

Most of the preliminary survey effort in Gloucestershire has been concentrated in the southern part of v.c. 34. In the part of the county that borders Wiltshire, records have been easily obtained and the species seems to be fairly common. However, further west around the city of Bristol and along the south-east side of the River Severn a large amount of effort has been expended to obtain relatively few records and here the Harvest Mouse does seem to be more scarce. No records have so far been obtained from the west side of the River Severn in Gloucestershire. It is hoped to obtain more information on the relative abundance of this animal in different areas as the survey progresses.

Monmouthshire (vice-county 35)

There are records from ten one-kilometre squares, all in the south-east of the county. The first confirmed record was made at Magor Reserve in 1973. A nest collected at an earlier date has subsequently been identified as that of a Harvest Mouse. Most records have been made on the edge of woodland areas or in young plantations, but as of yet there are few records for the county, and little comment can be made about habitat choices.

HABITAT PREFERENCES

There are enough records from North Somerset and from Gloucestershire (both vice-counties combined) to permit a preliminary analysis of the habitat preferences seen in the two areas. This analysis is based solely on sites where nests were discovered; full habitat details are not available for every site, and in some cases more than one type of habitat was colonised, or more than one species of grass utilised for nest building.

As can be seen from Tables 1 and 2, there is a marked preponderance of records from wetland sites in North Somerset and for dry grassland, hedgerows and roadside verges in Gloucestershire. This is not just an expression of a difference in habitat availability, since there are large areas of marshland in Gloucestershire, particularly in the Severn Valley, yet so far efforts to record the species here have failed. Why there should be such a difference in habitat utilisation between the two areas is uncertain, and this point will be considered further as the survey progresses.

Taking both counties together, 54/79 (68%) of the records relate to nests being built in one of three species of grass *Dactylis glomerata, Phalaris arundinacea* and *Phragmites communis* . This percentage is based solely on the number of occurrences of each species of grass; if the number of nests found on each occasion was also taken into account the percentage would be even higher. Habitats containing a dense growth of one or more of these three grass species are ecologically very important to the Harvest Mouse. However, as Table 2 shows, a wide variety of grasses is, on occasion, utilised for nest building, even apparently unsuitable weak-stemmed grasses such as *Brachypodium*. The habitat data collected for Gloucestershire are very similar to those collected for Wiltshire by Browne & Gillam (1974). It should be noted that cereal fields as a habitat have probably been grossly under-recorded, and a detailed survey of cereal crops is about to be undertaken.

DISCUSSION

There are very few pre-1960 Harvest Mouse records for the Bristol area, and some of these are obviously erroneous. Little seems to have been known about the habitat requirements of the species and, except for the observations of Knapp (1829), most records relate to cereal fields or cereal ricks. Thus, in earlier reports on the mammals of the Bristol area Rudge & Charbonnier (1909) noted the Harvest Mouse to be "rare and local" and Tetley (1940) commented that "It has for long been considered rare and local in this district". It is most unlikely, however, that this was the case, the Harvest Mouse being present but overlooked. Experience has shown that the animal can be present in an area, but not recorded until a systematic search of the right habitats is made; the sudden upsurge in the number of records for this survey illustrates the relative ease with which records can be collected.

The Harvest Mouse is one of our easist small mammals to record - one simply looks for abandoned nests. These nests are of characteristic construction and cannot be mistaken for those of any other species of mammal or bird. As a result, most records are of nests found - very few actual animals have been recorded. Collecting records for nest sites is advantageous, however, as this supplies data on the types of habitat that the animal regularly utilises for breeding.

The Harvest Mouse has now been shown to be both widely distributed and relatively common in the Bristol area and this has probably always been the case. Nevertheless, there is an interesting situation in that certain areas containing large amounts of suitable habitat are apparently uncolonised. There also appear to be different habitat preferences in the various counties surveyed.

This survey is to be continued to examine further the factors which affect the distribution of the Harvest Mouse in the Bristol area, the apparent absence of the animal from some areas, and the habitat preferences suggested by the preliminary survey efforts.

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Table 1. Main habitats colonised by Harvest Mice.

	North Somerset		Gloucestershire	
	Number of occurrences	%	Number of occurrences	%
Ditches, Marshy Areas	14	41.2	1	2.4
Young Plantations	2	5.9	2	4.8
Woodland Borders	1	2.9	-	-
Hedgerows	3	8.8	10	23.8
Rough Grassland	12	35.3	14	33.3
Roadside Verges	2	5.9	12	28.6
Cereal Fields	-	-	3	7.1

Table 2. Main grass species utilised for nest building.

	North Somerset		Gloucestershire	
	Number of occurrences	%	Number of occurrences	%
Phalaris arundinacea	5	12.5	1	2.6
Phragmites communis	9	22.5	1	2.6
Carex spp.	4	10.0	-	-
Juncus spp.	2	5.0	-	-
Avena fatua	-	-	1	2.6
Deschampsia cespitosa	4	10.0	1	2.6
Dactylis glomerata	15	37.5	23	59.0
Agropyron repens	1	2.5	5	12.8
Arrhenatherum elatius	-	-	3	7.7
Brachypodium pinnatum	-	-	1	2.6
Wheat	-	-	3	7.7

VOLCANIC CLASTS IN THE BASAL INFERIOR OOLITE OF EAST MENDIP

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Volcanic rocks occur in several parts of the Bristol District. They are representative of two separate periods of vulcanism, Upper Silurian (Tortworth, East Mendip) and Lower Carboniferous (Goblin Coombe, Weston-super-Mare, Uphill, etc.). The Silurian volcanics of East Mendip mostly consist of rhyodacites, with lesser amounts of andesite, interbedded with tuffs and agglomerates (Van de Kamp 1969). The Carboniferous volcanics are more basic - basalts and basic tuffs. The field relationships and petrography of both sites have been described elsewhere (Reynolds 1907, 1924; Lloyd and Reynolds 1904; Van de Kamp 1969).

The Silurian volcanics of East Mendip occur in the core of the Beacon Hill Pericline, one of four en-echelon folds which control the structure of the Mendips. They are now exposed along a tract about 3½ miles long with a maximum width of a quarter of a mile, which extends from Beacon Hill, near Shepton Mallet, to Downhead in the east. The succession is at least 900 ft. thick and is completely surrounded by sediments of Old Red Sandstone age. These volcanics were first noticed by Charles Moore in 1867, who interpreted them as being intrusive into the Old Red Sandstone. He proposed that a period of explosive vulcanism had arched up the Mendip chain, in the process blasting out a large section of the Carboniferous succession, which now forms the inverted sequence at Luckington.

Grains of lava have been found in the O.R.S. at Beacon Hill, but until recently none were recorded from any of the younger rocks of this district. This note records the occurrence of rounded clasts of purplish grey, porphyritic volcanic rock, both in the basal conglomerate of the Inferior Oolite (Whatley Quarry on the north limb of the pericline), and in pre-Inferior Oolite fissure fillings in the Carboniferous limestone (Merehead Quarry, on the south limb). These quarries are, respectively, four and two miles from the present outcrop of the Downhead-Moonshill mass.

Over much of the east Mendip, Inferior Oolite (locally termed Doulting Stone) rests unconformably on the Carboniferous limestone. Locally it is conglomeritic. Sporadic developments of this conglomeritic facies can be found in the valley which extends from Whatley to Nunney and Holwell (Bristol Memoir, 1876, p. 123). At Whatley, this conglomerate forms a distinct bed which attains a maximum thickness of about 1 ft. The majority of the clasts consist of rounded to sub-angular fragments of chert and silicified Carboniferous Limestone. Minor amounts of quartzite and white quartzite are also present. Igneous clasts up to cobble size are occasionally found. The smaller clasts tend to be heavily rotted. A thin section of the freshest material shows this rock to be of andesitic type. Phenocrysts consist of plagioclase (about An_{36}) with lesser amounts of orthoclase and quartzite. The feldspars are partially sericitized but usually show good crystal outlines. Quartzite occurs as small irregular patches in the pilotaxitic, feldspar groundmass. Ferromagnesian minerals are not present as phenocrysts, contrary to what is commonly found in the Mendip volcanics. These minerals may occur in the groundmass. Small spots of haematite, possibly derived from primary magnetite, and patches of secondary calcite are common. Apart from the lack of ferromagnesian phencrysts, this rock appears to be the same type as found in the Silurian volcanics of East Mendip.

At Merehead, fissures within the Carboniferous Limestone often contain variable amounts of conglomerate, shelly or crystalline limestone, and/or blue to greenish-grey clay. The clay may be pyritic and usually contains comminuted shell debris. This fissure fill is probably Rhaetic-Inferior Oolite in age (Robinson 1957). Rhaetic fossils have been obtained from similar fissures at Holwell (C.Moore 1867). The Inferior Oolite-Lower Carboniferous unconformity is seen in the N.E. workings of the Quarry, but no basal conglomerate is developed. Small, heavily rotted clasts of porphyritic igneous rock bearing an overall similarity to those found at Whatley, are occasionally found in the shelly clay. To date, none have been positively identified in the associated conglomerates. These sediments may occupy the entire fissure, or rest with sharp discordance against heavily iron-stained Permo-Triassic breccias and/or sheets of 'flow stone calcite'. Replacement bodies of Fe and Mn oxides are occasionally found in association with these red breccias.

It has long been suggested that the Silurian volcanism of East Mendip were subject to erosion at least as early as the Jurassic period. The discovery within the Inferior Oolite, of clasts of volcanic rock of a broadly similar type to those occurring in the Moonshill-Downshead mass, confirm this hypothesis. Clasts from the

Merehead fissures show that erosion was occurring prior to Inferior Oolite times. Robinson suggested that, in the East Mendips, a total thickness of at least 11,000 ft. of Carboniferous rocks were eroded from the tops of the developing anticlines during the formation of the Mendip folds. Exposure of the lavas probably occurred towards the end of the Triassic period. The large volumes of limestone rubble produced during the denudation of the Mendips would account for the apparent lack of igneous clasts within the Permo-Triassic rubble fissure fill.

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SOME COPPER, LEAD AND MANGANESE MINERALS FROM MEREHEAD QUARRY, EAST MENDIP

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ABSTRACT

This paper describes the rare secondary copper, manganese and lead minerals found associated with the manganese oxide mineralisation in the Merehead Quarry, East Mendip. The mode of occurrence and general disposition of the manganese-iron mineralisation in the quarry is briefly described. The mineral assemblage is compared with that occurring at Higher Pitts Farm, Priddy, and the possible role played by sea water in the formation of the oxychloride minerals is discussed.

INTRODUCTION

Merehead Quarry (ST 698443), in the eastern Mendips, is opened in Clifton Down Limestone (Lower Carboniferous) on the southern flank of the Beacon Hill Pericline. A noteworthy feature of the geology at Merehead is the occurence of iron and manganese oxides as replacement deposits. This Permo-Triassic mineralization is controlled by a well-developed system of faults and joints. The lead carbonates cerussite, $PbCO_3$, and hydrocerussite, $2PbCO_3.Pb(OH)_2$ are found associated with the manganese oxide. Rarer minerals, mostly oxychlorides of copper and/or lead, are sparingly developed among the manganese oxides. The identifications are based on microchemical tests and on optical and X-ray diffraction studies. Certain other minerals found during recent work have not yet been finally identified.

Spencer and Mountain (1923) described a closely similar assemblage of minerals from Higher Pitts Farm, near Priddy in the western Mendips, but there has, up to now, been no further systematic study of the Mendip iron-manganese mineralisation, nor of the associated rarer minerals. Recent work at Merehead Quarry has shown that Rhaetic and Jurassic sedimentary material is often closely associated with the iron-manganese mineralisation. It is thought likely that chloride ions from seawater have percolated through the manganese oxides and so promoted development of the oxyhalide minerals. The necessary cations were probably already present, adsorbed on manganese oxide. It is known that manganese oxides, especially those originally formed as hydrated gels, can adsorb cations and build up strong concentrations. The background level of these cations in the local environment need not be high. They will tend to be remobilised whenever the gel consolidates and begins to crystallize. The essential role played by sea water in the development of oxyhalides is indicated by observations made on MnO_2 replacement bodies in the Carboniferous Limestone of Cumberland. There, it is possible to discover high levels of Ag, Pb, Cu etc., but no oxychlorides or lead carbonates occur. There is nothing in stratigraphic evidence to suggest that these Cumbrian ores, once developed, were at any later time exposed to contact with sea water.

Iron-manganese mineralization

Iron and manganese oxides occur at Merehead in faults, joints and fracture zones. They are replacement deposits in the Carboniferous Limestone. Some of the fractures had developed into open fissures prior to mineralization. The fissures either were filled with limestone rubble or else became part of underground watercourses. This latter interpretation may be suggested for fissures now filled with flowstone calcite and inverted aragonite. Two types of vein may be distinguished on the basis of primary fill: they are high-calcite veins, in which calcite is the major infill component, and low-calcite veins, which have lesser amounts of primary calcite. In both types, the iron minerals are more abundant than the manganese. So far, the rarer minerals have mostly been found only in low-calcite veins. Two of these low-calcite veins are currently exposed (Fig.1: see No. 1 and No. 2 veins). They show considerable variation in width, mineral distribution and development. The veins show a tendency to narrow downward. Most of the fissure veins at Merehead have a certain amount of Jurassic infill, usually as limestone breccia. The Jurassic infill is almost entirely unaffected by the relatively early, Fe-Mn mineralization: exceptions are found in places where there has been local staining or where Jurassic clasts occur adjacent to a particularly heavily mineralized part of a Fe-Mn vein. The veins have a central, heavily mineralized part, up to 2 m wide, bordered on either side by up to 5 m of rotted, fractured and discoloured limestone. This grades into the country rock. The central zone consists of an irregular string of high grade ore concentrations separated by tracts of poorly mineralized ground, in which there is rotten, iron-stained limestone together with red marl and/or limestone breccia. The course followed by the central zone has been determined by the distribution of the least consolidated, and therefore most easily replaced, fractured ground. The manner of occurrence of the manganese oxides again indicates the patchy nature of the mineralization. These oxides are found as discrete pods which follow the course of the iron mineralization, and as replacement bodies in the adjacent limestone.

Iron minerals, usually goethite, frequently occur as discontinuous rims to the MnO_2 pods. The manganese oxide increases in purity towards the centre of the pods. Occasionally, pods show a gradation from goethite into mottled blue-grey MnO_2 which is enriched in iron. The "manganiferous iron ores" make up a sizeable proportion of these iron-rich pods.

The manganese oxide, as now found, is black to steel grey, dense, earthy to compact, with a dull to submetallic lustre. The fracture varies from uneven to conchoidal depending on the degree of compactness of the ore. Colloform banding is often developed; the external form of a mass of ore will frequently reflect this internal structure. Many specimens show desiccation cracks. The ore is usually cavernous. Cavities may contain MnO_2 or any of a variety of secondary minerals. These are usually calcite and/or the lead carbonates cerussite/hydrocerrusite (lead is one of a number of trace elements present in the manganese dioxide: locally it may reach a concentration of 8% by weight). Alternatively, the cavities may have remained empty. The rarer minerals are often found within these cavities, where they are usually associated with lead carbonates. The secondary minerals may have filled part only of the available space; they can be found either as discrete crystalline to amorphous masses or else they may encrust the cavity walls.

Irregular modular structures, composed chiefly of calcite, are also found. They are randomly distributed through the Mn ores. They range in size up to 5000 cc and show a variable degree of internal ordering. In No. 2 vein they are more abundant and larger than in No. 1, and there is also a consistent marked difference in internal structure between the two sets (see Fig. 2a, b). Both (but especially those from No. 1) show differentiation into shell and core. The prismatic to acicular habit of the calcite in the shell region may be due in part to manganese oxide present as an impurity - such habits are rare in these veins where calcite is free of iron or manganese oxides. The core regions, when present, usually consists of coarsely crystalline sparry white calcity. Interspaces tend to be filled with cerussite or hydrocerussite and the rarer minerals are often associated with these. Occurrences of the rarer minerals within such calcite nodules is a characteristic of No. 2 vein. Cavity fillings in mottled, blue-grey manganese oxide, the purest Mn

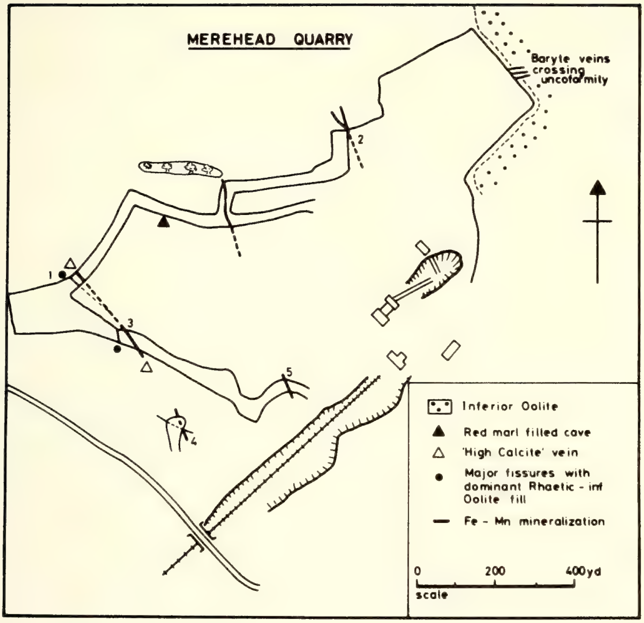

MEREHEAD QUARRY
Baryte veins crossing uncoformity
1
2
3
4
5
▨ Inferior Oolite
▲ Red marl filled cave
△ 'High Calcite' vein
● Major fissures with dominant Rhaetic - inf Oolite fill
— Fe - Mn mineralization
0
200
400yd
scale

Fig. 1. Map of Merehead Quarry showing principal Mn-Fe veins.

Ore found in the iron-rich pods, may have an internal structure that bears some resemblance to that found in the calcite nodules of No. 2 vein (Fig. 2c). These cavity fillings rarely exceed a volume of 500 cc.

Mineral assemblages

The majority of the rare minerals encountered at Merehead Quarry are oxychlorides of lead or of lead and copper. Table 1 lists the minerals so far found.

Table 1.

Oxychlorides	Oxides	Other minerals
mendipite	crednerite	wulfenite
chloroxiphite	pyrolusite	pyromorphite
diaboleite	polianite	mimetite
blixite		barite
paralaurionite		rhodochrosite
		aragonite

The oxychloride minerals are almost always found associated with the lead carbonates, usually hydrocerussite, and these, in turn, occur in direct association with the manganese ores. Occasionally, the lead carbonates may be found in cavities in iron oxides that lie immediately adjacent to manganese ores. The oxychloride minerals alter to hydrocerrussite. Alteration of hydrocerussite to cerussite usually involves breakdown of any oxychlorides that are associated with the hydrocerussite. Oxychlorides, therefore, are rarely found developed in cerussite. If copper was present in the original oxychloride, malachite and azurite may emerge during the process of alteration (green and blue stains on the lead carbonates can usually be taken as an indication of the presence of copper-bearing minerals at an earlier stage). The oxychlorides always show some degree of alteration. The other minerals listed in Table 1 are not so closely associated with the lead carbonates, but are, apparently, restricted to the manganese ores. Descriptions of the minerals follow.

Cerussite $PbCO_3$ (orthorhombic) and Hydrocerussite $Pb(OH)_2 2PbCO_3$ (Hexagonal)

In hand specimen these two minerals often appear similar. Both form vitreous to pearly, transparent to translucent, brittle, dense, crystalline to amorphous masses. They occur as nodules, cavity fillings, veinlets and thin films developed along cracks in the manganese ore. They do not appear to develop in the ferruginous manganese ore until the manganese content approximates to, or exceeds that of iron. They are frequently found together; crystalline cerussite forming an often discontinuous rim round the hydrocerussite. Pseudomorphs of cerussite after hydrocerussite are occasionally found. Amorphous, white, crumbly mixtures of cerussite and hydrocerussite are found where alteration of hydrocerussite is in an advanced state.

Cerussite crystallises in a variety of habits. Simple crystals, usually tabular $\{010\}$ and elongated $[001]$ or $[100]$ are commonly developed. Small pseudohexagaonal dipyramidal crystals are also found. These are less common, and to date have mostly come from No. 2 vein. Longitudinal striations [100] are commonly developed on certain crystal faces. These striations are rarely found in hydrocerussite. The crystals are invariably corroded. Twinning is common, usually occurring on {100}. The {130} law is rare. Groups of tabular crystals, repeatedly twinned on {100} producing a hexagonal, reticulate habit are common at Merehead. This habit is often found in crystalline cerussite that has developed as an alteration product of hydrocerussite, notably on lumps of altered mendipite (Fig. 3). Large corroded water-clear crystals, twinned on {100} are occasionally found in cavities in the manganese ore. Two good cleavages {100} {021} are sometimes developed, with {010} {012} very poor and indistinct. The cleavages are not always visible. The exceptional brittleness of this mineral causes it to shatter, showing the conchoidal fracture instead of breaking along the cleavage planes. Grey cerussite usually breaks along the cleavages. The grey colour is due to finely divided black particles, probably manganese oxide, disseminated throughout this mineral. It has a vitreous to sub-metallic lustre, and forms small, compact nodules and veinlets in the manganese ore. It is invariably covered by a white efflorescence of lead carbonate, and appears to be altering to the normal white variety. It is sparingly developed in the manganese oxide and some of the calcite nodules of the No. 2 vein. Cerussite is biaxial negative ($2V \simeq 9^\circ$), has a high refractive index, and is non-pleochroic. Hydrocerrusite has one perfect cleavage {0001} which is usually visible, a pearly lustre being developed on this surface. Longitudinal striations and the tendency for cerussite to form transparent vitreous masses serve to differentiate these two minerals in the field.

Flame tests on cerussite from Priddy and Merehead reveal traces of strontium and occasionally barium. Cerussite derived from the alteration of hydrocerussite also contains strontium. Neither strontium nor barium could be detected in the parent hydrocerussite or mendipite. Strontium, barium and lead form isomorphous carbonates. At both Mendip localities, the presence of stronium in the cerussite provides an additional method of differentiating these two minerals. (Massive, crystalline, greyish white to pale amber coloured cerussite, containing up to 4.48% $SrCO_3$, has been reported from Colorado (Warren 1903). No barium is present. It mainly occurs as an alteration product of phosgenite. No strontium was detected in the phosgenite. The formula $(SrPb)CO_3$ was suggested for this mineral).

The Strontium in the Mendip Cerussite was possibly derived from the carboniferous limestone. Aragonite, both as a primary chemical precipitate and as the major component of calcarious marine organisms was probably present in large amounts in the sediments which now form the Carboniferous limestone. Aragonite may hold within the crystal lattice up to 8000 ppm. Sr, but Calcite only 400 ppm. (Nickless et al 1975). During diagenesis, conversion of the metastable Aragonite to Calcite would release large volumes of Sr into the environment. Some of this Sr was probably incorporated into the crystalizing Cerussite. It is suggested that most of this remobilized Strontium migrated into the Triassic rocks where conversion of Gypsum and Anhydrite to Celestite took place (Nickless et al 1975).

The cerussite from No. 2 vein often has a yellowish-green colour.

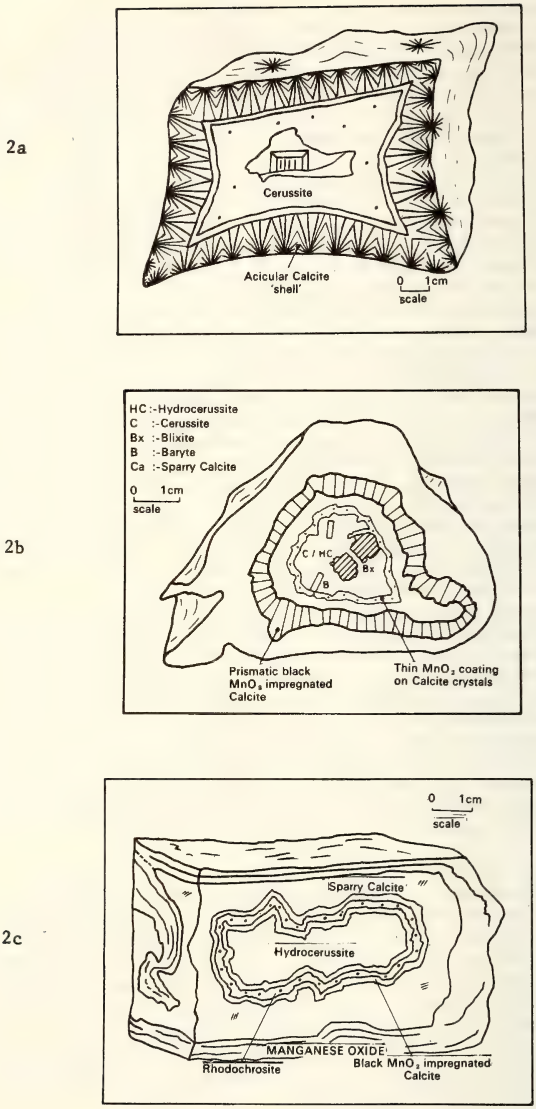

2a
Cerussite
Acicular Calcite 'shell'
0 1cm
scale
2b
HC :-Hydrocerussite
C :-Cerussite
Bx :-Blixite
B :-Baryte
Ca :-Sparry Calcite
0 1cm
scale
C / HC
Bx
B
Prismatic black MnO$_2$ impregnated Calcite
Thin MnO$_2$ coating on Calcite crystals
2c
0 1cm
scale
Sparry Calcite
Hydrocerussite
MANGANESE OXIDE
Rhodochrosite
Black MnO$_2$ impregnated Calcite

Fig. 2. Calcite nodules from no. 1 and no. 2 veins.

a. typical nodule from no. 1 vein.
b. typical nodule from no. 2 vein.
c. cavity filling, no. 1 vein.

This green cerussite commonly forms thin surface coatings on the tabular hydrocerussite crystals. The cerussite frequently shows lamella twinning, producing a radiating (or triangular) pattern. Internally the greenish layer consists of intercalated discontinuous bands of clear cerussite and cloudy white and green material. A faint resemblance to flow banding is sometimes found. A layer of cloudy white, seemingly structureless cerussite or hydrocerussite is usually developed at the interface of the green material and the normal white hydrocerussite. Snow-white and green coated hydrocerussite crystals commonly occur in the same cavity. The intensity of colouring may vary over the surface of the crystals.

Lemon-yellow cerussite also occurs. This is less common than the green variety. To date it has only been found in significant quantities associated with mendipite in the iron rich pods from both veins. It tends to grade into the yellowish-green cerussite. In the No. 2 vein it is occasionally found with what appears to be yellow hydrocerussite and may form intimate mixtures with this mineral. The yellow "hydrocerussite" forms soft, dull irregular patches, developed along the cleavage planes of the mendipite. This yellow material occasionally partially pseudomorphs the mendipite. Relatively hard, opaque, compact vitreous mixtures of yellow-green cerussite and "hydrocerussite" occur at the margin of the mendipite. Away from the mendipite this material may grade into a white counterpart. Lemon-yellow cerussite also forms crystalline encrustations and thin films on the white hydrocerussite associated with the mendipite. Small baryte crystals which may be encrusted by the yellow cerussite are themselves uncoloured.

The cause of the colour is uncertain. Microchemical tests for Cu, Cd, As, P, Mo, V, Ni, Cr, Bi, Sb, and SO_4 proved negative. Traces of Cl were found in some of the yellow hydrocerussite/cerussite mixture at the mendipite margin; more in the yellow "hydrocerussite" developed along the cleavages.

Limited substitution of Cl for OH has been reported (Dana, 1934). The theoretical end member $2PbCO_3.PbCl_2$ has been suggested as the ultimate conclusion of this substitution series (Spencer & Mountain, 1923). The absence of P, and As, eliminates disseminated mimetite-pyromorphite (both yellowish to yellowish green) as the colouring agent. An X-ray diffraction trace of the yellow crystalline cerussite from No. 1 vein shows the presence of an unidentified impurity. Prolonged heat treatment and six hours exposure to long wave ultra-violet light has no effect on the coloration. Neither green nor yellow cerussite is fluorescent. It is possible that rare earth elements, notably the bivalent ions of europium (straw yellow), ytterbium (green) and samarium (reddish brown), substituting for lead in the cerussite lattice may be responsible for the colouration.

Eu^{2+} is both similar in chemistry and ionic radius (1.24Å) to strontium (1.27Å). Europium, and to a lesser extent samarium and ytterbium, tend to follow strontium and become concentrated in strontium bearing minerals. Green strontianite from Argyll is heavily enriched in europium and samarium, with significant levels of other rare earths. Green pyromorphite from Ems, Germany, contains $>$ 1000 ppm.Eu (Goldschmidt, 1954). Sr is present in both the coloured and uncoloured cerussite.

Rare earth elements are fairly abundant; more so than some of the commonly used non-ferrous metals. They tend to be concentrated in amphiboles, pyroxenes, epidotes and early formed K-felspars (Goldschmidt, 1954). Weathering of these effects concentration of rare earths in the hydrolysate minerals such as the manganese and iron oxides. The Moons Hill andesite, a Silurian eruptive, now exposed in the core of the Beacon

Hill anticline, is a possible source. Merehead is only two miles, and down dip, from this body. The lack of green or yellow cerussite from Higher Pitts may be explained by the absence of any nearby rare earth source. There are no know igneous bodies near Priddy. Due to the absorbitive properties of MnO_2 a slight enrichment in Rare earth elements (above the general background level) may have occurred within the Mn ores at this locality. If this is so, the levels present may not be sufficient to effect coloration of the cerussite (c.f. Wulfenite).

The coloration in the yellow Hydrocerussite is less easily accounted for. The crystal structure of this mineral is such that substitutions of Pb. by Ba, Sr, and the Rare earth element is very difficult. L. Meister showed that white lead, artificial $2PbCO_3.Pb(OH)_2$, may acquire a yellowish tinge on standing in the dark. This colour is bleached on exposure to light (L. Meister, in Mellor, 1929). This is probably a structural colour, caused by a crystal lattice defect. It is possible that stabilization of this coloured modification by some impurity may be the cause of the colour in the, yellow, "hydrocerussite" from Merehead.

Hydrocerussite was first recorded in 1877 from Långban, Sweden. Prior to its discovery in large amounts at Higher Pitts (Spencer & Mountain 1923) it had only been found, sparingly developed, at a few localities. In the Mendips it usually occurs as snow white, vitreous to pearly crystalline masses.

When crystallized, it occurs as thick tabular {0001} crystals or clusters of thin, snow white scales, flattened {0001}, with hexagonal outline. Well formed crystals are abundant in the calcite nodules of No. 2 vein. Small lenticular crystals are occasionally found, but these are uncommon. Similar crystals were recorded from Higher Pitts (Spencer & Mountain 1923). Steep sided, hexagonal bipyramidal crystals {0001} often appearing to have been built up of layers of the thin hexagonal scales, are quite common. When {0001} is small, they are similar in shape to the bipyramidal cerussite crystals. Some of these may be corroded pseudomorphs of cerussite after hydrocerussite. Large barrel-shaped crystals, appearing to have been built up from the hexagonal crystals are also found.

A thin layer of cerussite, often repeatedly twinned, is developed on the surface of the tabular hydrocerussite crystals. These twin lamellae are commonly arranged into radiating or fan-like groupings, in the plane of {0001}. The lamellae in any one group are not usually continuous with those in another. Close examination of these clusters shows the lamellae to be arranged in parallel bands. Each band is commonly orientated at either ~15° or ~30° to the one on either side (see Figs. 5a, b). This would suggest a definite crystallographic orientation between the cerussite, derived by alteration, and the parent hydrocerussite. In any one group, the point of origin of the radiating bands does not always coincide with some obvious feature on the surface of the hydrocerussite crystal. Crude lamellae are sometimes developed on the massive hydrocerussite and on the dipyramidal crystals. Lamellae arranged in a triangular pattern were seen in addition to these radiating groups, at Priddy (Spencer & Mountain 1923).

Mendipite $Pb_3O_2.Cl_2$ orthorhombic

One of the earliest references to this mineral is given by J. Woodward, in 1728, in his bock "Catalogue of English Fossils" in which mendipite is reported to occur "near Bristol". It was not classified as a distinct mineral until 1823 when Berzelius described and analysed samples from Churchill, nine miles S.E. of Priddy. The mendipite at Priddy does not seem to have been noticed until about 1890 (H.B.Woodward). It has since been found at Långban, Sweden, in the Altai Mts. of Siberia, and at the Kunibert Mine, Westphalia. It is the commonest oxychloride mineral at Merehead.

Mendipite occurs as irregular lumps, cavity fillings, and thin veinlets in the black manganese oxide ore. It appears to be more abundant in No. 1 vein than in No. 2 vein. It is always surrounded by a hydrocerussite alteration rim, this in turn locally altering to coarsely crystalline cerussite. When broken open, the perfect prismatic cleavages (100) (110) (010) are seen, giving the appearance of a columnar or fibrous aggregate. The cleavages continue right across the mineral ending abruptly at the surface. The cleavage traces often show a tendency to fan out at one end. No distinct crystals have been found. The nodule may only contain one crystal individual but usually two or three are present, more in the highly irregular lumps.

Mendipite is a brittle, dense (6.8), soft (~2.5) transparent to translucent mineral with a white streak and pearly to silky lustre on the cleavage surfaces. A vitreous lustre is developed on the irregular cross-fracture. The mineral varies in colour from white to creamy-yellow, although a red or purple tinge is often seen in some parts of the crystal. With prolonged exposure to strong light the colour fades, suggesting that a crystal lattice defect may be partially responsible for the colour. Under similar conditions some specimens are reported to develop a reddish-brown surface colouration (Mellor, 1929, p. 741). Manganese oxide staining, accompanied by partial alteration to hydrocerussite is occasionally developed along the cleavage traces. Other minerals, notably diaboleite, chloroxiphite, and occasionally crednerite may be developed within the mendipite. There appears to be no preferred orientation of these minerals with respect to the longitudinal mendipite cleavages. Mendipite is biaxial + ve with $2V \approx 90^{\circ}$, non pleochroic and shows straight extinction. It has a very high refractive index and the prismatic cleavage fragments are length slow.

Mendipite occasionally appears to show partial alteration to paralaurionite Pb(OH)Cl. This mineral occurs as soft waxy, pale yellow crystalline masses which grade into the mendipite: Considering the abundance of hydrocerussite as an alteration produce of mendipite, the absence of the chemically related mineral phosgenite $PbCO_3.PbCl_2$ is strange. The unit cell of paralaurionite is related in structure to that of matlockite PbFCl (Wykoff, 1964). The structural similarity between matlockite, hydrocerussite and phosgenite (Sjögren, 1926) has been disproved. Matlockite is not a lead oxychloride as was previously thought (Nieuwenkamp, 1933). Recent works on the structure of mendipite (Gabrielson, 1958) may explain the absence of phosgenite.

The unit cell of mendipite contains 4 $Pb_3O_2Cl_2$ units (Bannister 1934). The lead atoms are arranged in two groups of six, occupying the corners of two tetrahedra which are linked together along one edge. The oxygen atoms occupy the centres of these tetrahedra which are held together by strong covalent Pb-O bonds. The two Pb_6O_4 tetrahedra in each unit cell share a common edge with one tetrahedron in the adjacent cell above and below, forming long chains in the direction of the C-axis. Strong Pb-O bonds hold the chains together longitudinally. The Cl atoms are sited in the channels between these chains, relatively weak ionic Pb-Cl bonds holding the chains together laterally. The prismatic habit and perfect longitudinal cleavages are manifestations of this structure (Gabrielson, 1958). Breakdown of the mendipite lattice will commence at the weakest parts. These are likely to be the weak interchain Pb-Cl bonds. Alteration along the cleavages and pitting of the cleavage surfaces is often seen in Merehead specimens. Removal of the relatively weakly held Cl ions might be expected early in the alteration process. This would probably precede attack on the Pb_6O_4 chains. The structure would thus be depleted in Cl at the points of alteration, rendering the formation of hydrocerussite more likely.

Limited substitution of Oh by Cl has been reported in hydrocerussite (Dana, 1934). If the early formed relatively Cl rich solutions were not dispersed, subsequent breakup of the Pb_6O_4 chains would produce hydrocerussite which would be amenable to Cl substitution. Simple substitution of this type might also be expected to favour the formation of phosgenite. That paralaurionite was formed instead is probably due to local conditions at the site of alteration favouring the formation of this simpler structure. Mendipite from No. 2 vein, showing partial alteration and pseudomorphism of the prismatic habit by the yellow, chloride bearing "hydrocerussite", may be breaking down to some simpler oxychloride in this way.

An as yet unidentified lead oxychloride having a superficial resemblance to asbestos is occasionally found in some of the calcite nodules, a cerussite/hydrocerussite alteration rim always being present. When broken open these nodules show an internal structure very similar to that found in mendipite. It is a dense, soft (~2) translucent, colourless to white mineral with white streak and vitreous to silky lustre. A perfect prismatic cleavage is developed. Cleavage fragments consist of thin silky flexible fibres. The fibres extend right across the nodule, ending abruptly at the surface. The silky fibres are similar in appearance to those of asbestos, are soluble in 1:7 HNO_3 with no effervescence, and cleavage fragments are optically length slow. A good optic figure could not be obtained on the fibres, but they appear to be biaxial. X-ray diffraction analysis shows this mineral not to be mendipite. Pseudomorphism of the overall fibrous habit by white hydrocerussite is occasionally seen.

Chloroxiphite $2PbO.Pb(OH)_2.CuCl_2$ monoclinic

Chloroxiphite is a rare mineral, first described in 1923 by Spencer & Moutain from Higher Pitts farm, Priddy. To date, Merehead is the only other locality from which it has been recorded. It is an olive to epidote green mineral, soft (~2.5), dense (6.9), very brittle, with a resinous to adamantine lustre, and characteristic yellowish green streak. Two cleavages {101} {100} are developed, {101} being prominent. The original material described by Spencer & Moutain consists of elongated [010] bladed crystals flattened {101}, developed as sub-parallel groups and single crystals embedded in mendipite. The crystals, the largest of which measured 3 cm x 1 cm x 1 mm, appear to show no preferred orientation relative to the longitudinal mendipite cleavages. These crystals may, however, have developed along potential mendipite crystal faces. Interlaminations of chloroxiphite, mendipite, and diaboleite are occasionally seen. Rough striations [010] on {101} are visible in good crystals (Spencer & Mountain, 1923). Twinning has not been reported. Under the microscope, chloroxiphite shows straight extinction [010], vivid polarisation colours, and strong pleochroism. Cleavage fragments and crystals lying on [010] are emerald green for vibrations parallel [010], and brown for vibrations across the crystals (Specer & Mountain, 1923). The optic figure is biaxial negative, with 2V≈80°. The similarity in habit, cleavage, pleochroism, and degree of symmetry to that of epidote has been noted by Spencer.

The mode of occurrence of chloroxiphite at Merehead is similar to that at Priddy. It is sparingly distributed, mainly occurring in Cu-rich Mn-oxide pods in both No. 1 and No. 2 veins. In these pods it may be relatively abundant.

Although usually occurring in mendipite, this mode of occurrence is not universal. Specimens from Priddy (Kingsbury Coll. M13 Bristol Mus.) show corroded bladed crystal aggregates embedded in emerald green copper stained hydrocerrusite. Two small specimens from No. 2 vein show chloroxiphite occupying small cavities in the calcite nodules, and very minor amounts of white hydrocerussite are associated with them.. Some specimens from Merehead (No. 2 vein) have a cross-hatched appearance visible in the plane of the {101} cleavage, suggestive of twinning, but no evidence of twinning was seen in thin section. Two sets of striations at ~80° are visible and extinction is parallel to these. They are probably cleavage traces. A difference in pleochroism was seen in one elongated fragment when parallel to the N-S crosswire of the microscope. One end was green whilst the other was greenish brown. This suggests that the cross hatching is due to intergrowth of two sets of crystals at ~90° to each other (Fig. 3).

Alteration of chloroxiphite usually results in a dull, compact, green intimate mixture of cerussite/hydrocerussite and malachite. This material occurs at the edges of the crystals and may pseudomorph the chloroxiphite blades when these project into the cerussite/hydrocerussite mendipite alteration rim. Similar pseudomorphs of a dull blue compact microcrystalline material, possibly an intimate mixture of diaboleite and hydrocerussite were noted on the type material (Spencer & Mountain, 1923).

Diaboleite $2Pb(OH)_2.CuCl_2$

Diaboleite was first recorded and described from Higher Pitts farm by Spencer & Mountain in 1923. It occurs embedded in mendipite, often in intimate association with chloroxiphite. It has since been found as well formed crystals up to 1.5 cm diameter in the 500 ft.level of the Mammoth Mine, Tiger, Arizona (Palache 1941). At this locality it is associated with other secondary lead and copper minerals. These include wulfenite, cerussite, hydrocerussite, linarite, dioptase, phosgenite, boleite, and a white acicular mineral. Merehead is the only other locality from which diaboleite has been recorded.

It is a light blue, soft (2.5), brittle, dense (5.32) mineral, having one good cleavage [001], conchoidal fracture, and pale blue streak. The lustre is vitreous to adamantine on crystal faces, becoming pearly on cleavage surfaces. It is transparent and resembles both linarite and azurite in appearance. It may be readily distinghished from these by its uniaxial negative figure, given on sections viewed normal to the {001} cleavage, and by microchemical tests for Pb, Cu, Cl. In its optical and physical properties it is very similar to the boleite, pseudoboleite, cummingtonite group of minerals. Boleite has a greenish tint in transmitted light, diaboleite is pale blue. All are uniaxial negative and approximate to the formula $Pb(OH)_2.CuCl_2$. With the limited amount of pure material available to them, Spencer & Mountain found a significant difference in specific gravity and chemical composition in their mineral.

At both Mendip localities, diaboleite occurs embedded in mendipite, often as single poorly formed prosmatic crystals or as sub-parallel prismatic crystal groups. Interlaminations of mendipite, diaboleite and chloroxiphite are occasionally seen. It may occur as an alteration product of chloroxiphite. In this form it is a dull, compact, fine grained, pale blue aggregate, possibly a mixture with some other mineral, replacing, and occasionally pseudomorphing, chloroxiphite crystals (Spencer & Mountain, 1923). This is also seen at Merehead. It appears to be more stable than the other oxychloride minerals, pale blue spots of crystalline diaboleite occurring in both hydrocerussite and cerussite. At Merehead it is found developed in paralaurionite. The paralaurionite appears to have been derived from the mendipite into which it grades. No preferred orientation between paralaurionite and diaboleite is apparent.

Well-formed crystals are rare at either Mendip locality. Spencer & Mountain recorded three small poorly-formed crystals from Priddy, and one has been recorded from Merehead. The latter, developed on paralaurionite, shows hemimorphism, with square striations parallel to the crystallographic axes developed on the large negative pedion. These features are characteristic of diaboleite (Palache). The positive pedion is small or absent, this end of the crystal being dominated by a large 2nd order pyramid. Viewed normal to (001) the crystal is square in outline, as opposed to the octagonal form commonly seen in crystals from Arizona (Palache).

Paralaurionite $Pb(OH)Cl$ monoclinic

This mineral was first recorded from Laurium, Greece (Smith, 1898). It had formed as a result of the action of sea water on ancient lead slags. At this locality it is found with phosgenite, fiedlerite $Pb_3(OH)Cl4$, penfieldite $Pb_2OH\ Cl_3$, and the polymorph, laurionite. It occurs with phosgenite, laurionite and anglesite at Wheal Rose, Sithney, Cornwall, where lead lodes have been permeated by sea water (Russell, 1927). To date, Merehead is the only other British locality.

It is a soft (∼1.5), dense (6.15) mineral, showing a single perfect cleavage {100}, vitreous to adamantine lustre, and white streak. The cleavage surface is very similar in overall appearance to that of selenite. Transparent to translucent paralaurionite, is usually colourless. White, or rarely green or violet (rafaelite) tinged varieties are known from other localities (Dana, 1934). Rafaelite is strongly pleochroic. Paralaurionite is not brittle, crystals and cleavage flakes bending readily about [010]. In this respect it resembles phosgenite (tetragonal), the latter flexing about directions perpendicular [001]. Although monoclinic, paralaurionite usually forms pseudorhombic crystals, the result of twinning on {100} with (100) as the composition plane. They are commonly thin, tabular {100} or elongated [001] with wedge-shaped or rectangular terminations (Palache, 1934). No crystals have been recorded from Merehead.

Paralaurionite is very rare at Merehead. Most of the specimens have come from an iron-rich manganese oxide pod in No. 1 vein. It occurs as translucent, sulphur yellow corroded crystalline masses within cerussite/hydrocerussite lined cavities in the brownish black manganese oxide ore. A specimen now in the University of Bristol Geology Department Museum which was collected several years ago by Dr. I.S. Loupekine shows paralaurionite in close association with mendipite. The paralaurionite appears to grade into this mineral, the prismatic habit of the mendipite being traceable for a short distance laterally into the paralaurionite. This relationship suggests alteration of the mendipite to paralaurionite. Prismatic diaboleite crystals are developed in both minerals. The apparent stability of diaboleite (Spencer & Mountain, 1923) may explain its resistance to alteration along with mendipite. The association of diaboleite with paralaurionite is rare, the Collins vein, Mammoth Mine, Arizona, being the only other recorded locality.

The sulphur to lemon-yellow colour of the Merehead samples is anomalous (Embry, private communication 1975). It is non-pleochroic. Paralaurionite is biaxial negative, with medium to large 2V. {100} sections show anomalous interference figures; the result of twinning. Untwinned crystals are not common (Palache, 1934).

Paralaurionite and laurionite are identical in chemical composition, and commonly occur together, but they differ markedly in physical and optical properties. Laurionite is hard (3-3.5), dense (6.24), non pleochroic, and possesses true orthorhombic symmetry. The crystal habit is similar in both minerals, but laurionite does not flex or give an interference figure on {100}. Parallel striations [021] on {100} are sometimes found on laurionite. To date, this mineral has not been found at Merehead. The factors that determine which paramorph crystallises are not fully known.

Paralaurionite readily alters to cerussite. Microcrystalline cerussite occurs both picking out the cleavage traces and as an alteration rim round the sulphur-yellow Merehead material. Paralaurionite is the more stable of the two paramorphs. Laurionite, fielerite, penfieldite are all either soluble in or slowly decomposed by cold water. This may partially explain their absence from the Mendip region.

Blixite $Pb_{16}Cl_8(O.OH)_{16-x}$. where $x \simeq 2.6$. Orthorhombic

Orthorhombic Blixite, first recorded from Långban, Sweden, in 1923, was not described until 1958 (Gabrielson *et al*). It occurs as thin yellowish crystalline coatings of fissures in hausmannite impregnated dolomite in the "Amerika" stope, Långban. It is one of several yellowish oxyhalide minerals occurring at this locality. These include Nadorite, $SbPbO_2Cl$, ecdemite, $Pb_6As_2O_7Cl_4$, heliophyllite, $Pb_6As_2O_7Cl_4$, sahlinite, $Pb_{14}(AsO_4)O_9.Cl_4$, and perite, $PbBiO_2Cl$. None of these have yet been recorded from Merehead. To date, Merehead is the only other locality from which blixite has been recorded.

It is a dense (7.35) soft (~3) orange-yellow to pale yellow mineral with pale yellow streak and one good cleavage, of uncertain crystallographic orientation (Gabrielson *et al*. 1958). It has a vitreous to dull lustre, becoming resinous on the uneven fracture surface. Translucent when crystalline, no crystals have to date been recorded from either locality. It does not fluoresce under ultra-violet light. It is non-pleochroic with high refractive index and gives a biaxial negative figure: 2V~80° (Gabrielson *et al*. 1958).

At Merehead blixite is sparingly developed in both veins, but appears to be more abundant in No. 2 vein. It occurs as sugary to coarsely crystalline pale yellow to reddish orange masses, often with a slightly mottled appearance. It has been found in No. 1 vein in the iron rich manganese oxide pods. It occurs in hydrocerussite-lined cavities within sparry calcite bands in the black manganiferous iron ores. It also occurs in the nodule like structures developed in the purer manganese oxide in these pods. An alteration rim of white microcrystalline hydrocerussite is invariably developed round this mineral.

In No. 2 vein, it occurs as cavity fillings and veinlets in the calcite nodules. Alteration to hydrocerussite is usually in an advanced state. Dense white sugary masses of hydrocerussite containing patches of pale yellowish-orange unaltered blixite are commonly found. These

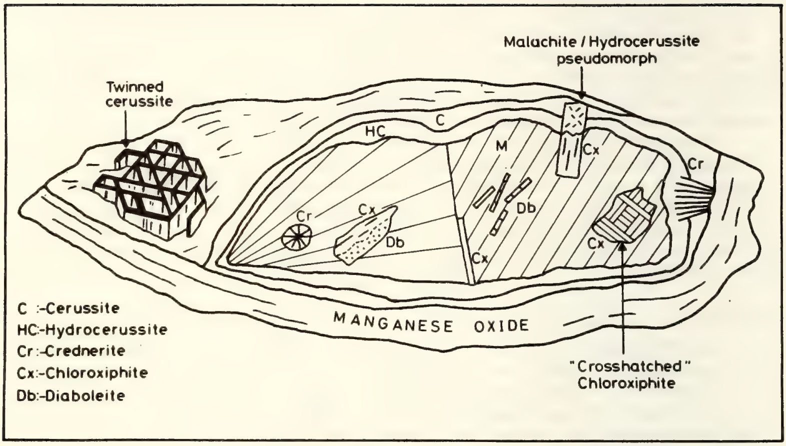
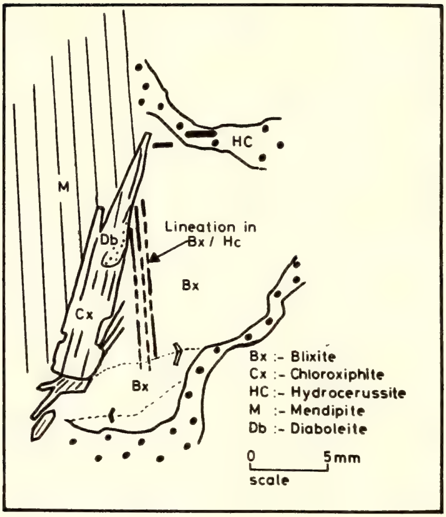

Malachite / Hydrocerussite pseudomorph
Twinned cerussite
HC
C
M
Cx
Cr
Cx
Db
Cr
Cx
Db
Cx
Cx
MANGANESE OXIDE
"Crosshatched" Chloroxiphite
C :-Cerussite
HC:-Hydrocerussite
Cr:-Crednerite
Cx:-Chloroxiphite
Db:-Diaboleite

Fig. 3. Diagram to show the relationship between Mendipite and some of the other lead and copper minerals.

Fig. 4. Lineation in Blixite, possibly representing replacement or intergrowth of Blixite by Mendipite.


HC
M
Db
Lineation in Bx / Hc
Bx
Cx
Bx
Bx :- Blixite
Cx :- Chloroxiphite
HC :- Hydrocerussite
M :- Mendipite
Db :- Diaboleite
0 5mm
scale

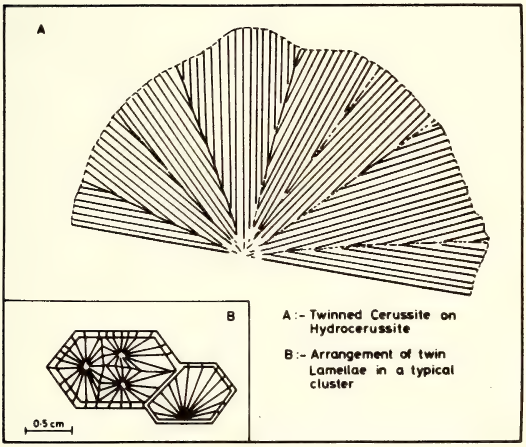

A
B
0·5 cm
A :- Twinned Cerussite on Hydrocerussite
B :- Arrangement of twin Lamellae in a typical cluster

Fig. 5. Arrangement of Cerrusite twin lamellae on Hydrocerrussite.

lumps may reach 25 cc in volume. Occasionally the hydrocerussite has recrystallised. White barrel-shaped hexagonal crystals made up of aggregates of the thin scaly crystals are developed on the altered blixite.

Other minerals are occasionally found associated with blixite. These include crednerite, sometimes seen as small platy crystals growing into the blixite (No. 1 vein); and chloroxiphite, mendipite, and diaboleite. One specimen (Bristol Museum No. Da5799) shows mendipite in direct contact with blixite. Chloroxiphite blades thrust into the blixite, the major portion of each crystal being embedded in the mendipite. Very small crystals showing good outline are completely enclosed in the blixite. Small spots of a light blue mineral, well removed from any of the other copper minerals are seen in the hydrocerussite alteration rim. This mineral may be diaboleite. Similar blue spots occur in this position in other specimens of blixite. Close examination of the blixite/mendipite contact reveals a lineation in the blixite (depicted by a slight colour/textural difference from the rest of the blixite) which is continuous with the longitudinal mendipite cleavages (see Fig. 4). This would suggest replacement of the mendipite by theBlixite. Microchemical tests on this zone show the presence of Cl^-, Pb, and CO_3^{--}, which suggests that this region is composed of an intimate mixture of blixite and hydrocerussite. Whether this lineation shows the former presence of a mendipite/blixite intergrowth, or a simple replacement of mendipite by blixite could not be determined.

Blixite is soluble in nitric acid (1:7), and gives positive reactions for lead and chlorine. Spectrochemical analyses have shown the presence of small amounts of As, Sb, Bi, Mg, Mn, Fe, and the alkali metals. X-ray powder photographs (Gabrielson et al. 1958) have shown it to be structurally similar to nadorite ($SbPbO_2.Cl$). It is suggested that blixite may be a distorted modification of $PbSbO_2Cl$, where lead has replaced antimony, and at the same time the O-positions in the unit cell are vacant or partially occupied by hydroxyls. Nadorite associated with jamesonite has been recorded from Bodannon Antimony Mine, St. Endellion, Cornwall (Russell, 1923).

Crednerite $Cu\ MnO_2$. Monoclinic.

Crednerite was first described from Friedrichroda, Thuringia, by Credner in 1847. Analysed by Rammelsberg, it was also described by Hausmann under the name "Mangankupferoxyd" in his book "Handbüch der Mineralogie" published in the same year. At this locality it occurs as black, foliated crystals, associated with volborthite, $Cu\ Ca\ (VO_4)_3$, baryte, calcite, cerussite and various Mn oxides. It was found developed on the outside of "nodules of lead ore" between the cerussite and the enclosing wad. No other localities for crednerite were known until it was recorded by Spencer & Mountain from Higher Pitts in 1923. It has since been reported from Calistoga, California; Idilel and Tashgagalt, Morocco; and Merehead. The formula $CuMnO_2$ was not firmly established for the naturally occurring material until 1966 (Gaudefroy et al, 1963).

Crednerite is a dense (5.34) brittle fairly hard ($\sim$4) iron black mineral, with sooty black streak, and bright metallic lustre. Well formed crystals are rare. In the Mendips it commonly occurs as radiating or sub-parallel groups of thin platy crystals, flattened parallel {001}, developed at the contact between the lead carbonates and the cavity wall or lining (c.f. type locality). It is most commonly found associated with hydrocerussite or, to a lesser extend, cerussite. At both Mendip localities, it occasionally occurs in mendipite, as small 1-2 mm diameter spherules with a radiating internal structure. The largest known crystal of crednerite, a poorly found crystal measuring 4 x 3 x 6 cm was found by Kingsbury in 1940, at Higher Pitts.

Two sets of cleavages are developed. The most prominent cleavage is that parallel to the platy surface {001}. A second set, developed along 3 sets of mutually intersecting striae on {001}, cut this face at 76°. These striae are the result of rotation twinning on a $(41\bar{1})$ Law, (001) probably being the composition plane (McAndrews, 1956). In a crystal twinned twice on this law, the three directions of striae on the parallel (001) faces are at angles of 56, 56 and 68°. This would account for the pseudo-hexagonal outline of some of the crystals of crednerite described by Spencer & Mountain (McAndrews 1956). Treatment with 1 - 1 HCl enhances the hexagonal pattern formed by these striae on otherwise smooth (001) cleavage surfaces. Very occasionally, these twinned crystals may assume a hexagonal, stellate habit, a feather-like structure being developed in the radiating arms. This appears to occur where the mineral has developed in a narrow crack in the Mn ore, (Bristol Museum No. Da5597).

Crednerite undergoes progressive alteration, by leaching of Cu, to a copper-rich psilomelane. In the early stages, the crystal structure of crednerite is still preserved. The electrical imbalance in the molecule, caused by the removal of Cu, is compensated for by the oxidation of some of the Mn to the tetravalent state (Gaudefroy et al 1963). This partially altered crednerite is identical in hand specimen to the fresh mineral. Microprobe analysis shows it to be composed of a mixture of amorphous Cu and Mn oxides, and patches of unaltered crednerite. Crednerite from the Mendips largely consists of this pseudomorphous material. Due to the heterogenous nature of the Mendip crednerite, both the formula, $CuMn_2O_4$ and density, 5.03, given by Spencer & Mountain, were in error (Gaudefroy et al, 1963). X-ray data in the ASTM powder-file index is based on Mendip specimens. Iron, which is detected in some analyses of crednerite, is present as a contaminant. Substitution of iron for manganese does not seem to occur. Delafossite, $CuFeO_2$, is not isostructural with crednerite (Gaudefroy et al, 1963). Alterations of the copper oxides, produces malachite, which occurs as tufted hemispherical masses and small prismatic crystals developed along the cleavages and on the surfaces of the platy crystals. Azurite occasionally occurs in small amounts.

Under aerobic conditions, crednerite is metastable at NTP. It only becomes the stable form at temperatures above 970°. At Tachgagalt, its common association with manganite, MnO.OH, with total absence of polianite, MnO_2, suggest that it formed under low-temperature, possibly reducing conditions (Gaudefroy et al, 1963). $CuMn_2O_4$ readily forms in air on heating crednerite above 300°C. Under oxidizing conditions this compound might be expected to form instead of crednerite. To date this species has not been found in nature. However, $CaMn_2O_4$, Marokite, does occur at Tachgagalt. It occasionally forms narrow alteration rims round some grains of crednerite. It is suggested that at some stage after the formation of the primary Mn oxides, the environment became sufficiently reducing for crednerite to form. This phase would predate the formation of the oxidized minerals with which crednerite often occurs (Merehead, Higher Pitts, Idikel, Friedrichroda). At Tachgagalt no oxidation minerals are found and the crednerite is largely unaltered.

In theory, it is possible for both crednerite and the oxychlorides to be forming at the same time. On exposure to an aqueous solution of chloride ions, MnO_2 will form $MnCl_2$, under slightly acid conditions. Reaction of $MnCl_2$ with any simple lead salt, e.g. $PbCO_3$ might be expected to produce MnO, $PbCl_2$ and some lead oxide-chloride compound.

The relative quantities formed would depend largely on local variations in eH and pH. MnO is only stable under anaerobic conditions. Such conditions, which may be reducing, are often found in some parts of narrow, deep submarine fissures, where water circulation is restricted. The presence of blue pyritic clay of Rhaetic-Jurassic age, which occurs in some of the unmineralized fissures at Merehead, confirm that such conditions locally prevailed. Reaction of the MnO with copper ions, remobilized during the crystalization of the MnO_2 gels, could produce crednerite. Such a mechanism may account for the small spherules of crednerite that are found embedded in the mendipite at both Higher Pitts and Merehead. However, the common mode of occurrence of crednerite, as sheaves of crystals gowing out from the cavity wall, does suggest that formation of this mineral largely predated the development of the hydrocerussite and other minerals with which it is associated. Crednerite is not a mineral formed in the zone of oxidation as was previously thought.

In No. 2 vein an as yet unidentified mineral bearing a close similarity to crednerite, is occasionally found. Black, with bright metallic lustre, it is sparingly developed and when found, occurred as irregular platy masses in cavities in the Mn oxide. It is also found as small irregular foliated crystals in some of the calcity nodules and in calcity-lined cavities in the MnO_2 impregnated wall rock. It is not always associated with lead minerals, but has been found intimately associated with the snow-white scaly hydrocerussite crystals. Microchemical tests show Cu and Mn to be the main components. XRD examination confirms that this mineral is not crednerite. In terms of symmetry, streak, cleavages and pseudohexagonal crystal form it appears to be very similar to crednerite. It is less dense ($\sim$ 4.87) and much more friable than crednerite. The thin platy cleavage fragments are not as brittle as those of crednerite and may be slightly flexible. Alteration is to malachite.

Pyrolusite. MnO_2 tetragonal

Amorphous pyrolusite - 'Wad' - is the dominant component of the Mn oxide pods. Frequently associated with this is a crystalline variety. Its habit is very similar to that of fibrous goethite, but it is both softer ($\sim$2.5) than this mineral and possesses a silvery grey, metallic lustre. Granular patches of small interlocking silvery grey crystals are often associated with the fibrous pyrolusite. Local concentrations of these granular crystals occur throughout the amorphous oxide ore.

Well formed crystals are rare. These are occasionally found in some of the calcite nodules from No. 2 vein. They are most abundant in the large, "coreless" nodules, in which they either occur as widely separated, small, tetragonal crystals, or as discrete encrusting masses, on the cavity walls. Silver-grey to black, with bright metallic lustre, the crystals are commonly equant or stout prismatic [001] . They are brittle, with black streak, irregular fracture, and may show a perfect {110} cleavage.

The single crystals are never perfect, usually appearing to be a coalition of several smaller individuals. They seldom exceed 2 mm in length. Botryoidal, radiating pyrolusite, with a crystalline surface often has a stepped appearance. This is due to the aggregation of numerous small, tetragonal prisms into sub-parallel groups, producing several larger, mutually interfering curved crystals. These composite crystals may grade laterally into a disordered aggregate of intergrown prismatic, equant, and thick tabular, apparently pseudohexagonal crystals. Most of the encrusting crystal groups have this disordered arrangement. Twinning is rare, occasionally occurring on {031} {032}; polysynthetic twinning has been reported in polished sections (Dana, 1934). X-ray studies have shown crystalline Purolusite to be identical with polianite. (Vaux, 1937). Polianite commonly forms large tetragonal crystals that are built up from numerous smaller individuals. It is a hard (6-6.5), dense (5.06) mineral with steel grey, metallic lustre. Crystalline purolusite from Merehead ranges from ~2.5 (fibrous pyrolusite) to about 6 in some of the larger, steel grey, composite crystals.

Manganite, MnO.(OH) has been reported from Higher Pitts Farm (Kingsbury, 1941). An XRD has not been carried out on the specimens available in order to chick this identification. Pyrolusite commonly occurs in association with manganite, as an alteration product, and may pseudomorph this mineral. Steel grey to black, fibrous manganite may closely resemble both pyrolusite and goethite in habit. Its hardness (~4) and colour usually serve to distinguish it from goethite (H~5.5-6).

Mimetite ($Pb_5(AO_4)_3.Cl$) Hex, monoclinic, Pyromorphite $Pb(PO_4)_3.Cl$.Hex.

The first reference to these minerals is given by Wallerius, in his book "Mineralagie eller Mineralliket" published in Stockholm in 1748. Some confusion existed over their identity, both being described under the name "Grönblyspat", (Greenlead spar). By the 1870's it had been established that these minerals were end members of a complete series in which phosphorous and aresenic could freely substitute for each other. The names mimetite and pyromorphite are applied to the two halves of the series where As>P and P>As respectively.

These two minerals show close similarities in physical and optical properties. Crystals are often prismatic [0001] and simple in habit. Equant, tabular {0001} or pyramidal crystals also occur. They are soft (3.5-4) brittle minerals, with resinous to adamantine lustre, uneven-conchoidal fracture and poor {10I1} cleavage. Streak off-white, the s.g. varies throughout the series (Pyromorphite 7.14, Mimetite 7.28). It may drop to 5.9 or less where Ca substitutes for Pb. There is no series leading to chlorapatite ($Ca_5(PO_4)_3Cl$, the mineral hedyphane $(CaPb)_5(AsO_4)_3.Cl$ forming when the Ca:Pb ratio exceeds 1:1. Colour is variable, but pyromorphite is often yellowish-green whereas mimetite is frequently yellow or orange.

Crystals often show concentric growth, the As:P ratio being highest towards the crystal margins (Dana, 1934). Members of the series, especially when high in As, tend to be biaxial negative. Basal sections may show a division into six tri-angular areas, sometimes with a uniaxial core. Some crystals may be uniaxial throughout. In the biaxial parts of the crystal, the optic plane is usually parallel to a side of the hexagon. 2V is variable, up to 42°, and decreases with P content. Frondel (in Dana, 1934) suggested that these apparently anomalous optical properties are caused by inversion of the crystals to a pseudohexagonal orthorhombic form. The presence of mimetic orthorhomic twins were thought to cause the hour-glass structure seen in some basal sections. Recent work (Keppler, 1968) shows mimetite to be monoclinic. Three-fold twinning about the c-axis produces a hexagonal-shaped crystal and also reconciles the optical properties to the new, structural data. The uni axial crystals are either the result of micro-twinning, or are truly hexagonal form, possibly stabilized by foreign ions in the crystal lattice (Kepler, 1968). The hexagonal form of chlorapalite is stabilized by small quantities of OH ions. A monoclinic form of pyromorphite may also exist (Keppler, 1968). Mimetite is not as common as pyromorphite.

The first reference to pyromorphite in the Mendip region is that given by J. Woodward in 1728. It was worked at Green Hill, near Charterhouse, and occurred as yellowish-green crystalline encrustations, cellular, botryoidal masses and impregnations in a vein traversing the Old Red Sandstone. The village of Green Ore, near Priddy, may have been another locality for this mineral (Spencer & Mountain, 1923). No further occurrences were noted until 1923 when it was recorded from Higher Pitts farm. Pyromorphite was recorded by Kingsbury (1941) both at Priddy, and as small, yellowish green crystals developed in a galena-chalcopyrite-pyrite bearing calcite vein, at Batts Coombe Quarry,Cheddar.

At Priddy, mimetite occurs as thin crystalline crusts lining cavities in the Mn ore. Orange-brown in colour, it forms confused aggregates of minute prismatic crystals with resinous-adamantine lustre and whitish streak. Sheaf-like aggregates of sub-parallel crystals may occasionally develop. The crystalline masses grade off into amorphous sulphur-yellow powdery coatings and impregnations in the Mn oxides. It may grade into the yellow green pyromorphite, this either forming encrustations of prismatic crystals or warty crystalline aggregates.

At Merehead these minerals are usually found together. They most commonly occur as sulphur-yellow (mimetite) or yellow-green (pyromorphite) powdery or microcrystalline coatings on joints in the Mn oxide. Mimetite appears to be more abundant than pyromorphite. They also occur as dusty coatings to the cavity walls and other secondary minerals in the calcite nodules of No. 2 vein. Small pockets of minute, orange-brown prismatic crystals (M) are found either as cavity fillings in the nodules or in close association with any of the other lead minerals.

In this type of mineral assemblage, Mimetite-pyromorphite are frequently found associated with wulfenite and vanadinite or other V. minerals. A partial series exists between vanadinite and mimetite up to As:V~1:1. To date, vanadinite has not been recorded at Merehead. In conclusion it would be noted that, although the majority of the sulphur-yellow material is undoubtedly mimetite, the possible presence of other, yellow, arsenic minerals, e.g. Sahlinite and Ecdemite, must be borne in mind.

Wulfenite $PbMoO_4$ Tetragonal

First described by von Born, in 1772, from Annaberg, Carinthia, it was named after Franz Wulfen, Jesuit priest, who wrote a treatise on the lead ores of this area. It is a rare mineral in the U.K., prior to 1944 having been found at only five localities (Russell, 1944). It was recorded from Higher Pitts by Spencer & Mountain, (1923), and from Merehead by the British Museum. Wulfenite usually occurs as a secondary mineral, formed by the oxidation of lead and molybdenum-bearing minerals. It frequently occurs in association with pyromorphite, mimetite, vanadinite, cerussite, limonite, Mn oxides and calcite. At Merehead the lead and molybdenum were probably present as adsorbed ions in the Mn oxide gel. Crystallization of this gel would lead to remobilization of these ions which may, under suitable conditions, have reacted to form lead molybdate. Wulfenite from Merehead thus differs in its mode of formation, from that commonly found elsewhere. Oxiding conditions would still be required to raise the molybdenum ion to the 6-valent state.

In terms of density (wulfenite 6.5-7; cerussite 6.5), lustre, hardness (wulfenite 2.5-3; cerussite 3-3.5), streak and fracture, wulfenite is similar to cerussite and could be confused with this when massive. Unlike cerussite, it is not brittle, shows good cleavage {011} with {001} {013} poor. The colour varies from orange yellow to pale yellow or greenish brown. Specimens from the Mendips are mostly very pale wine-yellow, transparent to translucent. Uniaxial negative (cerussite biaxial negative, $2V\sim9^\circ$), some crystals may show an anomalous biaxial figure, with 2V up to 8° (Dana, 1934). It is weakly pleochroic in orange and yellow tints. Wulfenite gives a positive test for molybdenum. A small fragment of wulfenite is placed in concentrated HCl and evaporated to dryness. The residue, molybdic oxide and lead chloride, is wetted by a few drops of distilled water, followed by a few drops of 1:1 HCl, and granulated zinc. A pale blue smear round the walls of the test tube and/or a blue coloration to the solution is diagnostic of molybdenum. A blue smear may also appear on the walls of the test tube during the initial heating with HCl.

When crystallized, it commonly forms tabular {001} crystals which may be square or octagonal in outline. A flat vicinal pyramid may replace {001}. The tabular habit is seen at all of the British localities. Small, hemimorphic crystals, showing a very rare acute pyramidal habit, were noticed from Struy, Scotland, where wulfenite occurs with pyromorphite in association with Pb-Zn-Ba mineralization (Russell,1944).

Wulfenite is extremely rare in the Mendips. Spencer & Mountain in 1923 describe only three samples from Higher Pitts. These consist of small patches, up to 1 cm square, of tabular, granular, lenticular and flat bipyramidal wine yellow crystal encrustations, variously developed on cerussite, hydrocerussite and aragonite. Kingsbury, in 1940, recorded a further eleven samples from the same locality. These consist of rough crystals, of pale wine yellow colour, measuring up to 1-3 cm by 5 mm thick, mostly occurring on the outside of nodules of aragonite. Although unavailable for inspection, wulfenite from Merehead, found by the British Museum, probably has a similar mode of occurrence and habit to that from Priddy.

Wulfenite may occur as encrustation pseudomorphs after calcite, cerussite, pyromorphite and mimetite (Dana, 1934). Substitution of Pb by Ca and Wo results in a trend in composition towards the isostructural mineral powellite, $Ca(W.MoO_4)$. Tungsten substitution results in a partial series towards stolzite, $PbWO_4$, also isostructural with wulfenite. Cr, As, V, S, may substitute in small amounts for Mo. Cr usually imparts a reddish orange colouration to this mineral,(c.f. $PbCrO_4$, Crocoite, bright red). Wulfenite has been seen to alter to descloizite, $(ZnCu)Pb(VO_4)OH$, vanadinite, $Pb(VO_4)_3.Cl$ or ilsemanite, $(Mo_3O_8.n.H_2O)$ (formula uncertain, Dana, 1934). To date, none of these minerals have been recorded from Merehead.

The Wulfenite lattice can readily accommodate rare earth elements (Zambonini, 1923). The wine-yellow colour of Mendip specimens may be due to this. That coloured wulfenite occurs at Priddy, but not coloured cerussite may be due to a low rare earth background level, and the greater ease of substitution into the wulfenite lattice. That the rare earth elements are the cause of the colouration in either cerussite or wulfenite from Merehead is yet to be established.

Baryte $BaSO_4$ Orthorhombic

To date this is the only sulphate mineral to be found at Merehead. It occurs both as a secondary mineral in the Mn ores and as a component of sulphide-bearing calcite veins. The latter cut the Mn-Fe mineralization and/or the discordant Jurassic infill. Its occurrence in the Mn ores is considered here.

Baryte is sparingly developed, but has a slightly wider distribution than the lead carbonates, with which it is frequently associated.

It usually occurs as colourless transparent crystalline masses, sometimes showing good crystal form, in the cavities and calcite nodules in the manganiferous ores of both veins. Wine yellow baryte is occasionally found. By merit of the large number of calcite nodules in No 2 vein, baryte is somewhat more abundant in this area. It does not show any but a purely coincidental spatial relationship to the "rare minerals", when these are developed in the lead carbonates. It may occur in cavities in the brown, Mn-poor geothite at the margins of the iron-rich Mn oxide rocks. A slightly radiating habit is often developed, the perfect {001} cleavage imparting a bladed prismatic appearance to the colourless crystalline mass. Occasionally it forms discrete encrusting masses consisting of confused aggregates of pink or white sugary and prismatic crystals, developed on goethite, in some of the larger calcite nodules of No. 2 vein. Both these modes of occurrence are uncommon at Merehead and are not shared by the lead carbonates. Small, well formed, colourless crystals, similar in shape to the tabular cerussite crystals are common in the calcite nodules of No. 2 vein. These crystals, which are developed directly on the calcite lining, are often encrusted with calcite, less commonly dolomite and/or black crystalline purolusite. Cavities in the mottled brown-black MnO_2, from the iron rich rocks, No. 1 vein, were seen to contain well formed baryte crystals completely surrounded by the massive H.C. No Ba was detected in the H.C. The tabular baryte crystals may be distinguished from those of cerussite by the lack of effervescence on treatment with dilute HNO_3. Three cleavages {001} perfect, {021} {010} good, are usually developed. The cleavages and baryte's slightly greyish tinge also serve to differentiate the crystalline baryte from the water-clear, brittle cerussite. The optics (Biax positive $2V\sim36^\circ$), specific gravity (4.50), insolubility in 1:7 HNO_3 and the apple-green colouration to the flame test confirm baryte.

The presence of baryte would suggest that other sulphate bearing minerals, notably anglesite $PbSO_4$ and leadhillite $PbCO_3.PbSO_4.Pb(OH)_2$., may occur. To date neither have been found. Leadhillite was found (Spencer & Moutain, 1923) as an alteration product of Roman lead slags at Priddy. Leadhillite may be confused with hydrocerussite where it occurs as thin snow white hexagonal scales. Treatment with 1:7 HNO_3 leaves an insoluble residue of $PbSO_4$. A drop of K_2S solution added to the washed residue will cause it to turn black due to the precipitation of black PbS. Baryte is isomorphous with anglesite, substitution of Lead for Ba, up to Pb:Ba 1:4 being recorded (Dana, 1934). Microchemical tests on some of the baryte shows considerable traces of Pb. Optics (Biax positive $2V\sim68$), density (6.38) and the reaction with K_2S solution serve to differentiate anglesite from baryte. Baryte can alter to witherite, $BaCO_3$ (Dana, 1934). Cloudy white rims are occasionally seen on some baryte crystals but these do not appear to be witherite.

Rhodochrosite $MnCO_3$ Trigonal

Although a fairly common mineral, rhodochrosite is rare in the Mendips. It was first recorded from Higher Pitts farm in 1934 (Kingsbury). It was subsequently found at Merehead, and in very small quantities at Whatley Quarry.

Rhodochrosite, first mentioned by Bergman in 1782, occurs in a wide variety of geologic environments (Dana, 1934). Its association with sedimentary Mn ores is common. Well formed crystals are rare, none having been recorded from the Mendip region. It is usually massive, coarsely granular, compact, or may form encrusting globular, botryoidal colour banded masses. Fracture uneven to conchoidal, it is brittle, fairly hard (3.5-4) dense (3.7) mineral, with white streak, vitreous to dull lustre, and good {10$\bar{1}$1} cleavage. The colour varies from pink to white or colourless, when it may be sub-transparent. Thin flakes are translucent. The variation in colour has been ascribed to the percentage of crystallinity and iron content of the mineral. Fe^{2+} substitution for Mn causes the rhodochrosite to become more yellow.

Pure $MnCO_3$ is rare, a small percentage of iron or calcium invariably substituting for Mn. A complete series extends between rhodochrosite and calcite, and also, with iron substitution, to siderite, $FeCO_3$. Pink manganocalcite ($MnCO_3$ $CaCO_3$, isostructural with calcite) is commonly found with rhodochrosite at Merehead. Rhodochrosite is uniaxial negative. The optical properties, notably refractive index, show a linear variation toward the iron and calcium end members (Wayland, 1942). Partial substitution by Mg, up to Mg:Mn 1:1.24, shows a trend towards magnesite, $MgCO_3$. Co and Zn may also show partial substitution for Mn. Before these relationships were established, the variation in composition caused uncertainty as to the precise nature of this mineral. The alternative name Diallogе, alludes to this.

At Merehead, rhodochrosite is only sporadically developed. It may occur as small, white, microcrystalline or granular cavity fillings in the relatively pure Mn oxide. In this situation it is associated with aragonite and calcite. It occurs in considerable quantities as the major cavity filling in the brown Mn-poor iron ores associated with the iron rich Mn oxide pods. It forms pink and white colour-banded botryoidal encrustations, often with a colourless transparent crystalline layer developed on the inner botryoidal surface. Small rhombohedral crystal faces are occasionally developed on this surface. With increasing Mn content the brown ores give way to black Mn-rich iron ores. Rhodochrosite gives way to calcite as the dominant cavity filling. An ordered sequence of deposition, commencing with sparry calcite, followed by banded rhodochrosite, with lead carbonates (occasionally with oxychloride minerals) in the centre, may be seen in cavities in this material. More commonly disordered structures are found, where irregular patches of calcite grade into manganocalcite and/or rhodochrosite. Lead carbonates first appear in the 'black ore'. In many cavities an often discontinuous layer of yellowish white $MnCO_3$ is developed between the calcite/cavity wall and the lead carbonates. This relationship is seen in cavities in the mottled, brownish-black, patchily iron enriched Mn oxide, the $MnCo_3$ layer seldom exceeding 1 mm thickness. Lead carbonates approximately equal calcite in importance as the cavity fill.

Specimens from Higher Pitts (Kingsbury collection) show colour banded rhodochrosite similarly developed on brown, manganiferous iron ore. This would suggest a similar mode of occurrence at both localities.

Aragonite $CaCO_3$ Orthorhombic

This is the orthorhombic crystalline form of calcium carbonate. $CaCO_3$ is polymorphous since the Ca^{2+} ion is of such a size as to place it in the critical range of radius ratio between the calcite and aragonite structure types. The calcite structure is more open than that of aragonite. In consequence, aragonite is slightly harder and denser than calcite. Aragonite is isomorphous with the carbonates of Pb, Sr, Ba. Their ionic radii are too large for them to form carbonates with a calcite type structure. Aragonite is unstable relative to calcite at all temperatures down to -100°C. Below this it may be the stable form. Over a period of time, slow irreversible conversion to calcite occurs in the presence of $CaCO_3$-containing groundwater. Aragonite is more soluble than calcite. Dissolution of the aragonite, accompanied by dispersion of the stabilizing cations (see below) results in reprecipitation of calcite. A 10% volume increase accompanies this process. Johnson *et al*. (1916) showed that precipitation of aragonite at N.T.P. would only occur if the solution was already saturated relative to an isomorphous carbonate. If this had already been precipitated, only calcite could form. Calcite-encrusting cerussite is common at Merehead. Wray & Daniels (1957) showed that the Pb, Sr, Ba carbonates only precipitate under strongly alkaline conditions. If the pH is too low for their precipitation, calcite, not aragonite, will form. It would thus appear that stabilization of aragonite can be effected by incorporation into the lattice of large cations that form isomorphous carbonates with it. The concentration of these ions in solution need not be large since, once seeded, the crystal will continue to grow as aragonite unless there is a significant change in environmental conditions (Wray & Daniels, 1957; Faust,1950). All specimens from both Merehead and Priddy that were tested, showed the presence of Pb. Strontium was usually present but flame tests for barium proved inconclusive. Aragonite from both localities is often intimately associated with cerussite. In all cases, flame tests showed significant traces of Sr in the cerussite. The aragonite lattice may also be stabilized by $CaSO_4$ (Wray & Daniels). No sulphate was detected in any aragonites tested.

Calcite and aragonite may be readily distinguished by differences in S.G. (calcite 2.71, aragonite 2.95, up to 3.0 in plumbian types), cleavages (aragonite lacks the rhombohedral calcite cleavage), optics (biaxial negative $2V \sim 18^\circ$) and chemical means. Aragonite rapidly turns grey and then black when placed in a warm solution of manganous and silver sulphates (Leitmeier's test). Calcite does so after several minutes, whereas rhodochrosite only goes grey after a long time. The speed of reaction of the common carbonates is thus:- Aragonite Strontianite Witherite Smithsonite Cerussite Dolomite Calcite Siderite Magnesite (Dana, Johnson *et al*. 1916).

Aragonite formed in two different environments at Merehead. Large sheets of flow stone, possibly originally deposited as aragonite, but now inverted to calcite, occur in the "High-calcite" fissure veins. The prismatic, radiating to collumnar habit of the crystals, often seen in the flow stone, is typical of that found in aragonite. Flame and microchemical tests fail to detect either Pb, Ba, Sr or SO_4 in this material. Spectrographic analyses showed Pb, V, Sn and Mn in quantities <100 ppm. The lack of Sr, Ba and the paucity of Pb is to be expected in inverted aragonite (Wray & Daniels). The prismatic, acicular radiating calcite that forms the "shell" of the calcite nodules of No. 1 vein may be inverted aragonite.

Aragonite of a later generation than the flow stone is often found associated with the Mn mineralization. It is most abundant in No. 2 vein where it occurs both within the calcite nodules and as a cavity filling in the Mn oxide. It usually occurs as compact masses of stout prismatic crystals, elongated [001](cf. flow stone) often intimately associated with and/or grading into, sugary white aragonite. The prismatic crystals are usually pinkish brown, translucent, and have a collumnar, radiating habit. The good {010} cleavage is prominant {011} {110} barely noticeable. A slightly fibrous appearance, either parallel or perpendicular {001} is visible in many crystals. The parallel {001} is caused by lamellar twinning. The sugary aragonite may preserve the general shape of the crystals or appear uniformly structureless. (Chemical tests prove it to be aragonite). In the calcite nodules, contact between calcite walls and aragonite is usually sharp. A thin layer of flow-banded calcite, usually manganiferous, is commonly developed at the interface. Occasionally this layer consists of microcrystalline, greyish-white rhodochrosite. Mn does not readily substitute for Ca in aragonite. If moderate amounts of manganese are present, calcite forms in preference to aragonite. Barely detectable amounts occur in the crystalline aragonite, a higher proportion being present in the sugary material. Where occurring as a cavity filling, the sugary material often rests directly against the Mn oxide. Under these conditions, some $MnCO_3$ is probably admixed with the aragonite.

Well-formed crystals are rare. Imperfect, pseudohexagonal crystals terminated by a large {001} and measuring up to 2-3 cm, are occasionally found in the calcite nodules of No. 2 vein. These crystals are pseudomorphs of calcite after aragonite, and are composed of a compact interlocking mass of sugary calcite crystals. Some of the larger crystals may be hollow, perpendicular {001}. They are always encrusted by small colourless calcite crystals; less commonly, baryte, cerussite or small MnO_2 crystals may be present as well. The fibrous lead mineral referred to previously was seen developed in the central, longitudinal, cavity in one of these pseudomorphs.

The pseudohexagonal form is the result of repeated twinning on {110} with {110} as composition plane. Basal sections of perfect unaltered crystals commonly show a sectorial distribution of the twinned individuals. This can occasionally be discerned in the calcite pseudomorphs. Weathering tends to enhance this.

CONCLUSIONS

Various lead, copper and barium minerals occur among the manganese oxides at Merehead Quarry. The sequence of events that led to establishment of these deposits may be suggested to have been as follows:

1. During deformation associated with the production of the Mendip folds, a system of faults and joints developed in the Carboniferous Limestone. Some of these fractures later evolved into open fissures and/or underground watercourses.
2. The fissures were largely filled with limestone rubble, and the caves with flowstone and water-laid marl.
3. During the main phase of Fe-Mn mineralization, iron and manganese in solution invaded the fractures, fissure-fill and cave deposits, and were precipitated as hydrated oxide gels. Replacement of the country rock and fill material was proceeding at the same time. There was local enrichment of either iron or manganese, probably due to variations of eH and pH. With increasing alkalinity, iron reaches its limit of solubility before manganese. Any silica in solution tends to be precipitated along with the iron. The structure and electrical charge of the manganese oxide gel permits adsorption of cations, for example Pb, Cu, Zn, Mo, As, from surrounding solutions. In a natural case such cations could possibly be derived from sulphide veins present in the groundwater catchment area.

4. Desiccation, compaction and slow crystallisation of the gel precipitates took place. Adsorbed foreign ions were remobilized. Calcitic nodules began to form.

5. Late in Triassic time the Mendip region subsided and was inundated by the Rhaetic sea. Tensional forces caused the fissures to gape. Fill material was reworked to some extent and eventually Rhaetic and Inferior Oolite sediments were added. Chloride ions from sea water reacted with the remobilized cations to produce oxychloride minerals. The bulk of the oxychlorides present in the Merehead deposits probably formed at this time.

6. Deposition of the Doulting Stone (Inferior Oolite) on the Carboniferous Limestone was followed by emplacement of calcite/baryte veins which carry lead, zinc and copper sulphides.

7. Local remobilization of iron and manganese under reducing conditions resulted in staining and/or small-scale replacement of Rhaetic-Jurassic infill. Staining and partial replacement of sulphide-bearing calcite veins also occurred.

8. Supergene enrichment of Cu took place, possibly contemporaneously with the events noted in 7 or else following soon after. Chalcocite (including the variety, djürleite) is present in some places.

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NOTE:- Before visiting any of these quarries, permission must be obtained from the Quarry management.

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AVONMOUTH: THE VANISHING HABITAT

By I.F. GRAVESTOCK

Towards the end of 1972 the Bristol Naturalists' Society's Conservation Committee was requested by the Gloucestershire Trust for Nature Conservation to assist with the mapping of semi-natural areas in South Gloucestershire, on similar lines to that previously undertaken in Somerset. The object of the mapping was to provide information on areas of natural history value for planning officers, so that this should be readily available if development seemed likely. The work was apportioned in 10 km. squares to a number of recorders, each to be responsible for a square. ST 57 was allotted to the writer.

In the Avonmouth sector of this square the implementation of the Bristol Development Plan is radically altering, if not altogether destroying, the natural habitat. The following notes, based on personal observations and on information compiled from various sources, describe briefly (1) some effects of the more important developments and (2) where the natural habitat survives, what action was taken towards conservation.

The area here considered lies between Avonmouth and Henbury and falls in about 10 sq. km. of tetrads 50/78, 52/78 and 54/78. The section within Bristol City boundary consists mainly of estuarine alluvial marshland with a clay subsoil, some below high water mark, sloping gently eastwards to 50 ft. O.D., but with levels of mostly 22 ft. It is protected by a sea-bank of height 32 ft., and drainage was, and to some extent still is, effected by intersecting rhines and ditches. To the north-east, outside the city boundary, lies Mount Skitham, a hill bordering on Hallen and crowned by Haw Wood, a mixed woodland on poorly-drained clay soil.

Until the late 1940s this area was farmed from scattered farmsteads, and with the exception of the old-established docks and railways and Avonmouth town was predominantly rural. Only the coastal periphery to just beyond St. Andrews Road Station was built up, with the smelting works near that station and storage installations along the sea-board.

Since the end of the Second World War, however, the developments planned in the 1920s have gone steadily ahead. In the development plan, the north-western portion of the earea from coast to motorway is scheduled for industrial development, with the exception of 73½ acres for sewage and refuse disposal. The acquisition of land by Bristol

Corporation and the Rio Tinto Zinc Corporation for trading estates and other purposes has resulted in the disappearance of nearly all of the farms. Other major developments have included drainage, housing and the motorway.

1. SOME EFFECTS ON THE NATURAL HABITAT OF THESE SCHEMES

(i) The Motorway. The chief impact of this, apart from noise, has been in the throes of its construction. Landscaping and planting have now greatly improved what was at first entire destruction of natural habitat at the intersections near Avonmouth.

(ii) Drainage. To bring the surface of the marshland in the area scheduled for industrial development to about 25 ft., it was necessary to import and tip hard material. The small rhines will eventually disappear. Concreted gullies and culverts now drain to five or six large rhines, and there is some pumping of stormwater.

(iii) Industrial Expansion. Immediately north of Avonmouth, Bristol Corporation's trading estate is in effect a continuation of urban Avonmouth. Building permits here are mainly for warehousing. Further north, land owned by RTZ is being sold in lots for factories. In both areas there is more or less entire destruction of natural habitat, but whereas Bristol Corporation is landscaping its trading estate, there is little indication of any attempt at improvement on parts of the RTZ estate, and a large acreage consists of slag, rubble, slush and builders' rubbish, and seems unlikely to support wildlife for a considerable time.

Where there is vegetation in this area, e.g. along St. Andrews Road, its condition is far from satisfactory. Plants are often coated with a thick layer of grey-brown dust, and many hawthorns and elders are dead or dying. The herb layer is also affected, though in varying degree. Analysis has shown the deposit to consist of various kinds of carbon and dust particles, whose provenance cannot be definitely laid at anyone's door. No doubt heavy traffic and also dock loading and unloading, are partly responsible. Salt spray carried in high winds off the sea is also a contributory cause.

Nearby is situated the lead and zinc smelter, owned and operated by subsidiaries of the Rio Tinto Zinc Corporation. This smelter, the largest in the world, recently came under fire for atmospheric pollution and consequent hazard to human health. A survey of serial pollution of vegetation by the heavy metals lead, zinc and cadmium was about the same time being studied by Drs. M.H. Martin and P. Little as part of the 'Sabrina' project. The results of their survey, published in 1972, showed concentrations ranging from 5000 ppm. of lead and 8000 ppm. of zinc in dry leaves of elm and hawthorn close to the smelter, to 100 and 200 ppm. respectively 10 km. or more away. From the high degree of correlation between amounts of these substances found in leaves and in the surrounding soil, it was concluded that aerial fall-out of metal-rich dust had a 'blanket effect' and coated vegetation and soil alike.

At present no quantitative estimate of pollution from the smelter can be given at any one time. Monitoring of pollution from this source is continuing, but measurements vary from month to month due to meteorological conditions. Meanwhile work continues on countering the pollution at source by improved techniques of control within the smelter, and this sometimes involves shut-down periods - in this connection, see the Windeyer Report (Code of Practice for the Protection of Persons Exposed to Ionising Radiations in Research and Teaching), Part 5, which makes recommendations on the monitoring of the working environment.

Pollutants other than heavy metals are primarily sulphur dioxide, oxides of nitrogen, carbon particles and fluorides. These probably emanate from various chemical and fertiliser firms in the vicinity of the smelter, from a brickworks and a carbon black factory.

(iv) Sewage and Refuse Disposal. As part of the policy of cleaning and rendering pollution-free the River Avon, a sewage disposal plant and incinerator for rubbish have been constructed off Lawrence Weston Road. Damage to the habitat in this sector has so far on the whole been less than in the vicinity of the smelter and in St. Andrews Road, Rhines and hedges have been retained, and the rhines, though often rubbish-choked, are not all dirty, and support a variety of vegetation. Among plants found here were *Typha latifolia* (Bulrush), *Sparganium erectum* (Branched Bur-reed) *Alisma plantago-aquatica* (Water-plantain), *Iris pseudacorus* (Yellow Iris), *Solanum dulcamara* (Bittersweet), *Callitriche* spp., (Water Starwort) and *Senecio vulgaris var. radiatus* (Groundsel, rayed variety). There was no lack of bird life, with Tits, Robins, Pied Wagtails and other small passerines, and Moorhens.

(v) Housing. To the south-east of the motorway, the housing estates at Lawrence Weston and Kingsweston have been occupied since 1948, and development scheduled here is for public open spaces, playing fields and some residential infilling.

2. THE MORE IMPORTANT NATURAL HISTORY AREAS AND THEIR CONSERVATION

(i) Meadows between Attwood Drive, Lawrence Weston and the Railway.

These meadows consist of marsh grassland, i.e. seasonally wet grassland, liable to flooding and surrounded by water-filled ditches. This is the only remaining wetland in the area under consideration, and in former times, before the land was drained to provide grazing pasture, would have supported typical marshland vegetation. The prevailing scarcity of this type of habitat makes it particularly worth conserving.

Thirty-nine species of birds have been recorded here since 1968. Sedge-warblers have been seen breeding, Reed-buntings holding territory and Herons fishing. Other species which have been seen include Kestrel, Great Spotted Woodpecker, Meadow Pipit, Blackcap, Whitethroat, Lesser Whitethroat, Chiffchaff, Willow Warbler, Stonechat, Greenfinch, Bullfinch and Linnet.

Butterflies were abundant, and included Hedge Brown, Meadow Brown, Small Heath, Ringlet, Large and Small Skipper and Small Tortoiseshell.

Among plants found in these meadows were *Silaum silaus* (Pepper-Saxifrage), *Galeopsis tetrahit* (Common Hemp-nettle), *Serratula tinctoria* (Saw-wort), *Succisa pratensis* (Devil's-bit Scabious), *Triglochin palustris* (Marsh Arrowgrass), and, in abundance, *Achillea ptarmica* (Sneezewort) and *Lychnis flos-cuculi* (Ragged-Robin). Six common species of *Carex* and five of *Juncus* were also found. Of particular interest was the discovery, in a wet flush, of *Eleocharis uniglumis* (Slender Spike-rush), which is known from one other station only in V.C. 34.

In autumn 1972 a proposal to tip rubbish behind Attwood Drive on to these marshes led to protests by local residents, who enlisted the support of the Society's Conservation Committee. Following a survey, representations were made by the Committee to the City Engineer on the natural history value of this area. The project was temporarily shelved, with every hope that further tipping would not be allowed.

(ii) Haw Wood Area. Many of the oaks and elms in this wood are dead, and other species - Ash, Birch, Scots Pine, Hazel, Spindle and Broom, are in poor condition. The ground flora, however, though largely a tangle of coarse species, also includes *Scutellaria galericulata* (Skullcap), *Lythrum salicaria* (Purple-loosestrife), *Polystichum setiferum* (Soft Shield-fern), and *Rumex sanguineus* (Wood Dock). The plateau outside supports *Juncus bufonius* (Toad Rush), *Centaurium* *erythraea* (Common Centaury), *Genista tinctoria* (Dyer's Greenweed), *Trifolium fragiferum* (Strawbery Clover), *Silaum silaus* etc. There are moles and rabbits in the vicinity.

In 1970, reports of the withered appearance of foliage in this and adjoining woods had led the Conservation Committee, suspecting atmospheric pollution, to inform the Gloucestershire Trust for Nature Conservation, who after investigation by Drs. Martin and Little, confirmed pollution by metallic particulates. It was also found that salt-spray carried by gale-force winds had affected the foliage.

GENERAL

These marshes and woods are both utilised for recreation by, and under pressure from, the local population, and though parts are in good condition, others are poor. Trees have been hacked or scraped at the bottom, with fires lighted against them. Hedgerows are clipped for firewood, and have been slashed, either by Corporation cutters or vandals. Constant trampling and the lighting of fires in woods have impoverished the ground flora, especially in Moorgrove Wood. A clean rhine is an exception; too many are choked with plastic bags, old tyres, boxes, baths, etc.

The overall picture, therefore, setting aside the inevitable urbanisation of the north-west portion of the area, is of environmental damage that is varied in nature and scattered in incidence. The visible effects of the pressures operating in these 10 sq. km. are plain. The most obvious casualties are the rhines, once a unique habitat for marsh and water plants and birds. Many, as stated, are due to disappear anyway; meanwhile those that remain are either dry or choked with *Phragmites* or, where water-filled, often slimy and foul, especially near the industrial waste tip behind Barracks Lane. There are the slashed hedgerows, particularly in Moorhouse Lane; the dead trees, of which about 1000 are elms (many of course dead as a result of Dutch Elm disease), and possibly 10% of that number are of other species; the dust-laden and moribund hedgerows of St. Andrews Road; the poor lichen flora downwind of Avonmouth; the mutilated woods, especially Moorgrove; the unknown pollution in one of the wet meadows that was apparently distorting *Ranunculus repens* and *Cerastium holosteoides* and road-widening schemes that of necessity destroy verges and rhines.

Of hidden effects the most disquieting, perhaps, is the possibility that vegetation may in the long run suffer from heavy metal pollution. In the survey by Drs. Martin and Little, few or no symptoms of toxicity could be discerned in leaves tested; nevertheless, some plants may well be weakened, with some adverse effect on growth. Yet in recent experiments on lead pollution in plants in roadside and urban areas, Dr. D. Briggs found tolerant of a concentration of several hundred ppm. of lead. Obviously much more research is needed on the long-term effects of this type of pollution.

To the planner, marshland is expendable, but to the naturalist it is of major importance and wherever practicable should be retained. It is significant that where protest was made, something was saved, if only for a time, and it is a step in the right direction for the causes of pollution to be diagnosed. In the Avonmouth area, and indeed in Severnside as a whole, Dr. Mellanby's dictum applies with particular force - 'Unless we control pollution .... the losses may be irreversible'.

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